E1.28: ONWI-120/app.

ONWI-120

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ORIGINAL

Gulf Coast Salt Domes
Geologic Area Characterization Report
Mississippi Study Area

Volume VII
Appendix

July 1982

Law Engineering Testing Company
2749 Delk Road, S.E.
Marietta, GA 30067

ONWI
Office of Nuclear Waste Isolation
BATTELLE Project Management Division

BIBLIOGRAPHIC DATA

Law Engineering Testing Company, 1982. *Gulf Coast Salt Domes Geologic Area Characterization Report,* ONWI-120, Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus, OH.

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Gulf Coast Salt Domes
Geologic Area Characterization Report
Mississippi Study Area

Volume VII
Appendix

July 1982

Law Engineering Testing Company
2749 Delk Road, S.E.
Marietta, GA 30067

This report was prepared by Law Engineering Testing Company under Subcontract E512-00400 with Battelle Project Management Division, Office of Nuclear Waste Isolation under Contract No. DE-AC06-RLO1830-ONWI with the U.S. Department of Energy. This contract was administered by the Battelle Office of Nuclear Waste Isolation.

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LIST OF SUBCONTRACTED DATA CONTRIBUTORS

SUBCONTRACTOR/ CONSULTANT	TASK	STATE
Dr. J. Aghassy	Report - Geomorphic Expression of Salt Domes	TX, LA, MS
Amoco Production Co.	Downhole Velocity Surveys	LA
Ana-Log, Inc.	Mud Logging	TX
Analytical Logging, Inc.	Mud Logging	MS
Dr. S. Aronow	Report-Erosion and Alluviation	TX, LA, MS
Austin Exploration, Inc.	Field Gravity Surveys	LA, MS
Dr. J. Braunstein	Paleontological Reports-Area Characterization Deep Borings	MS
C. H. Burt, Inc.	Seismic Reflection Data Processing	TX, LA
Dr. E. S. K. Chian	Chemical Analyses of Salt Core	MS
Consolidated Lab.	Mud Logging	LA, MS
Core Laboratories, Inc.	Mud Logging; Determining Physical and Chemical Properties of Sidewall Cores	TX, LA, MS
Culpepper Testing Laboratories	Water and Gas Chemistry Analyses	MS
DDR International	Scheduling, Budget, and Cost Accounting	TX, LA, MS
Daedalus Enterprises, Inc.	Collected Thermal Infrared Image Data	TX, LA, MS
Dresser Industries, Inc.	Geophysical Well Logging	MS
Exploration Techniques, Inc.	Interpretation of Gravity Data and Salt Dome Modeling	TX, LA, MS
GTS Corporation	Seismic Data Broker	LA, MS
Dr. E. Gavish	Mineralogic Analysis of Field Samples	LA

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SUBCONTRACTOR/ CONSULTANT	TASK	STATE
Gearhart-Owen Wireline Services	Geophysical Well Logging	LA
Geo-Log, Inc.	Geophysical Well Logging	TX
Geomap Company	Structural Geologic Maps for Study Areas	TX, LA, MS
Geosource, Inc. Petty Ray Division	Seismic Data Broker	LA, MS
Dr. L. deA. Gimbrede	Peleontological Reports-Area Characterization Borings	LA
Griswold Engineering	Field Surveying	LA
Harris Aerial Surveys	Low Altitude Color Infrared Imagery and Black and White Aerial Photos	TX
Dr. W. C. Isphording	Report-Heavy Mineral Analyses of Shallow Boring Samples	MS
Dr. R. O. Kehle	Report-Salt Dome Growth Rate	TX, LA, MS
Dr. D. H. Kupfer	Report-Salt Dome Internal Structure	TX, LA, MS
Layne-Central Co.	Well Logging	MS
Location Sample Service, Inc.	Mud Logging	MS
Mark Hurd Surveys	Black and White Aerial Photos	LA
Dr. C. W. Meade	Report-Salt Exploitation of Rayburns Salt Dome	LA
Mr. F. F. Mellen	Report-Mineral Resources in Cypress Creek Domal Area	MS
Dr . W. R. Muehlberger	Report-Winnfield and Grand Saline Salt Mines	TX, LA

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SUBCONTRACTOR/ CONSULTANT	TASK	STATE
Dr. G. E. Murray	Report-Mineral Resources Near the Eight Candidate Domes	TX, LA MS
Dr. O. L. Paulson	Paleontological Reports-Area Characterization Borings	MS
Petrophysics, Inc.	Synthetic Seismograms	TX, LA, MS
Prokop Exploration, Inc.	Gravity Data Broker	LA
Richardson Seismic Services, Inc.	Seismic Data Broker	TX
Ridgways, Inc.	Geophysical Well Log Broker	TX, LA, MS
Dr. R. W. Rodgers	Report-Salt Dome Growth	TX, LA, MS
Schlumberger Well Services	Geophysical Well Logging	TX
Seismic and Digital Concepts, Inc.	Seismic Reprocessing	MS
Sigma Exploration, Ltd.	High Resolution Seismic Data Acquisition	MS
Southwestern Laboratories	Water Chemistry Analyses	LA
Teledyne Exploration	Seismic Data Broker	LA
Thompson & Associates, Inc.	Field Surveying	TX
United Aerial Mapping	Topographic Mapping	LA
University of Arizona	Radiocarbon Dating	LA
University of Southern Mississippi	Reports-Terrace Mapping Report-Salt Core Petrography	MS
Dr. J. R. Wadsworth, Jr.	Geomorphic Consultant	TX, LA

VOLUME VII
LIST OF SUBCONTRACTED DATA CONTRIBUTORS (Continued)

SUBCONTRACTOR/ CONSULTANT	TASK	STATE
Dr. C. E. Weaver	Report-Clay Mineralogy of Shallow Boring Samples Report-Salt Core Petrology	MS
Dr. R. A. Welch	Report-Remote Sensing	LA, MS
Williams and Broom Surveyors	Field Surveying	MS
Willisco New Orleans, La.	Seismic Data Broker	MS
Willisco Houston, Tx.	Seismic Data Broker	TX

CONVERSION FACTORS

The conversion factors used in this report are based on the following table. In most instances, the metric-to-standard measurement conversions represent rounded-off figures in this report.

To convert from	To	Multiply by
millimeter (mm)	inch (in)	0.03937
meter (m)	foot (ft)	3.281
kilometer (km)	mile (mi)	0.6214
meter^2 (m^2)	foot^2 (ft^2)	10.76
kilometer^2 (km^2)	mile^2 (mi^2)	0.3861
hectare (-)	acre (-)	2.471
kilogram (kg)	pound (lb)	2.205
tonne (-)	ton (-)	0.893
liter (l)	gallon (gal)	0.2642
kilometers^3 (km^3)	miles^3 (mi^3)	0.244
kilopascal (kPa)	atmosphere (atm)	0.009869
milligrams per liter (mg/l)	parts per million (ppm)	1.0
liter per second (l/sec)	gallon per minute (gal/min)	15.85

ABBREVIATIONS AND ACRONYMS

AEC	Atomic Energy Commission
BEG	Texas Bureau of Economic Geology
BMI	Battelle Memorial Institute
BNI	Bechtel National, Inc.
DOE	Department of Energy
ERTS	Earth Resources Technology Satellite
FEA	Federal Energy Administration
LANDSAT	Earth Resources Technology Satellite (formerly ERTS)
LETCo	Law Engineering Testing Company
LSU/IES	Louisiana State University/Institute for Environmental Studies
MGAI	Mellen Geological Associates, Inc.
MM	Modified Mercalli
MMI	Modified Mercalli Intensity
MSGS	Mississippi State Geological Survey
MSL	Mean Sea Level
NAS	National Academy of Science
NRC	Nuclear Regulatory Commission
NSAI	Netherland, Sewell and Associates, Incorporated
NWTS	National Waste Terminal Storge
ONWI	Office of Nuclear Waste Isolation of Battelle Memorial Institute
ORNL	Oak Ridge National Laboratories
OWI	Office of Waste Isolation/Union Carbide Corp.
SCS	Soil Conservation Service
TAB	Technical Advisory Board
TNRIS	Texas Natural Resource Information System
USGS	United State Geological Survey
USM	University of Southern Mississippi

APPENDIX A

Borings

MISSISSIPPI STUDY AREA

APPENDIX A-1

DEEP BORING DATA

Thirty deep wells were drilled under the supervision of Law Engineering Testing Company between March and November of 1979 at eleven sites in the Mississippi Study Area. The data from these wells, which were drilled to depths that range from 389 to 1,841 meters (1,275 to 6,041 ft), helped to provide a better understanding of the stratigraphy, lithology, and ground-water hydrology of the region.

A Deep Boring Data Summary from the deepest well at each of the eleven sites is presented in Tables A-1.1 through A-1.11, with their locations shown in Figure A-4.1. Included in the summaries are lithologic descriptions of drill cuttings and rock cores, representative geophysical logs, and other pertinent data.

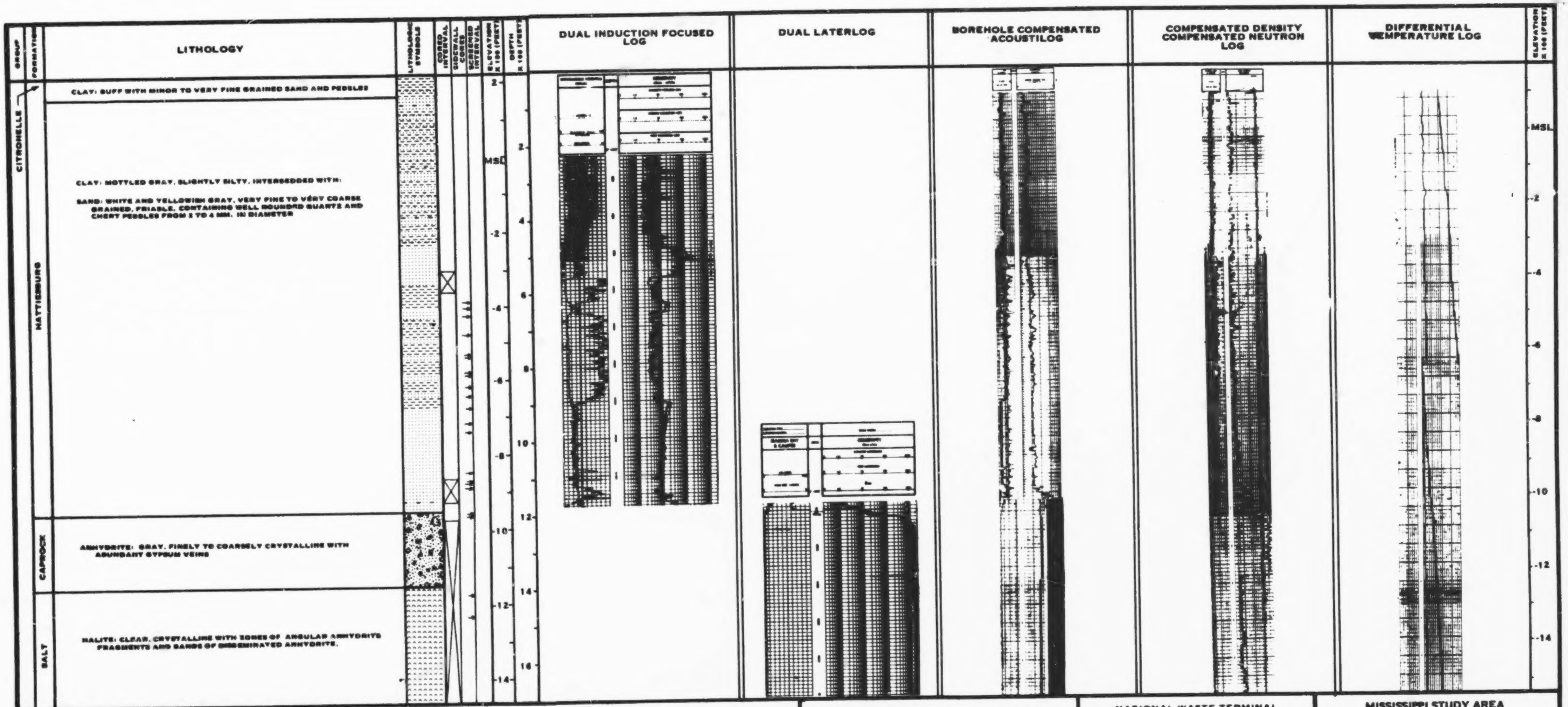
MISSISSIPPI STUDY AREA

APPENDIX A-1

DEEP BORING DATA

KEY TO LITHOLOGIC SYMBOLS

⁘	GRAVEL
░	SAND
▦	SILT OR SILTSTONE
▤	CLAY, CLAYSTONE, SHALE OR MUDSTONE
☰	LIMESTONE OR MARLSTONE
▧	DOLOMITE
●	CAPROCK (ANHYDRITE AND GYPSUM)
≋	SALT
▭	LIGNITE



CLAY: BUFF WITH MINOR TO VERY FINE GRAINED SAND AND PEBBLES

CLAY: MOTTLED GRAY, SLIGHTLY SILTY, INTERBEDDED WITH:

SAND: WHITE AND YELLOWISH GRAY, VERY FINE TO VERY COARSE GRAINED, FRIABLE, CONTAINING WELL ROUNDED QUARTZ AND CHERT PEBBLES FROM 2 TO 4 MM. IN DIAMETER

ANHYDRITE: GRAY, FINELY TO COARSELY CRYSTALLINE WITH ABUNDANT GYPSUM VEINS

HALITE: CLEAR, CRYSTALLINE WITH ZONES OF ANGULAR ANHYDRITE FRAGMENTS AND BANDS OF DISSEMINATED ANHYDRITE.

ELEVATION (FT.): GL 221.0 KB 231.0 TOTAL DEPTH (FT.) 1609.41
DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED
LOCATION: NE/SW, SEC. 9, T2N, R10W, PERRY CO., MISSISSIPPI (CYPRESS CREEK DOME)
HYDROLOGIC DATA:
1. TOTAL DISSOLVED SOLIDS: 16,300 MG/L
2. MAXIMUM TEMPERATURE: 88°F (DURING DRILLING)
3. ELEVATION BASE OF FRESH WATER: -600 FT MSL

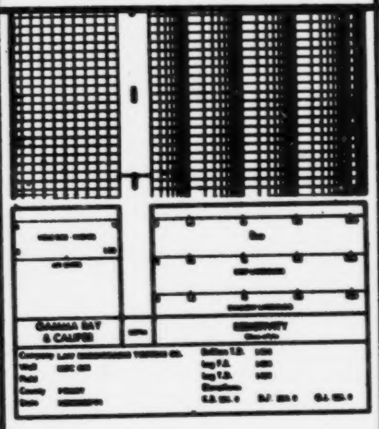
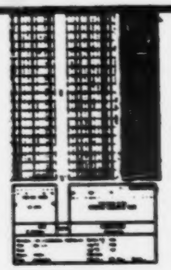
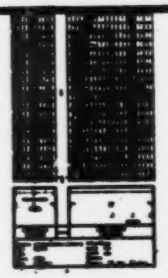
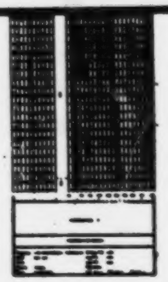
PREPARED	J.D.G.	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GHF	DATE	12/22/80

T-1597A-0

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX A-1
DEEP BORING DATA SUMMARY
DOE USA MCCG-1
TABLE NO. A-1.1
JOB NO. MV9700
PAGE 1 OF 2

BEST DOCUMENT AVAILABLE

GROUP	FORMATION	LITHOLOGY	LITHOLOGIC SYMBOLS	CORED INTERVAL	SIDEWALL CORES	SCREENED INTERVAL	ELEVATION X 100 (FEET)	DEPTH X 100 (FEET)	DUAL LATERLOG	BOREHOLE COMPENSATED ACOUSTILOG	COMPENSATED DENSITY COMPENSATED NEUTRON LOG	DIFFERENTIAL TEMPERATURE LOG	ELEVATION X 100 (FEET)
	SALT	SEE PRECEEDING PAGE	TD				-16	18 TD					-16

ELEVATION (FT.): GL 221.0 KB 231.0 TOTAL DEPTH (FT.) 1888.41
DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED
LOCATION: NE/SW, SEC. 9, T2N, R10W, PERRY CO., MISSISSIPPI
(CYPRESS CREEK DOME)

PREPARED	J.D.G.	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GHE	DATE	12/22/80

T-1597B-0

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA, GEORGIA

MISSISSIPPI STUDY AREA
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BEST DOCUMENT AVAILABLE

GROUP | FORMATION | LITHOLOGY | LITHOLOGIC SYMBOLS | CORED INTERVAL | SIDEWALL CORES | SCREENED INTERVAL | ELEVATION X 100 (FEET) | DEPTH X 100 (FEET) | DUAL INDUCTION FOCUSED LOG | BOREHOLE COMPENSATED ACOUSTILOG | COMPENSATED DENSITY COMPENSATED NEUTRON LOG | DIFFERENTIAL TEMPERATURE LOG | ELEVATION X 100 (FEET)

*1

CLAY: WHITE, RED ORANGE, SANDY TO SILTY
SAND: LIGHT BROWN, VERY FINE TO FINE GRAINED QUARTZ

HATTIESBURG - CATAHOULA

CLAY: LIGHT GRAY, YELLOW-GRAY, AND OLIVE-GRAY LOCALLY SANDY, POSSIBLY BENTONITIC

SAND: CLEAR AND WHITE, COARSE TO VERY FINE GRAINED, ANGULAR TO ROUNDED. CONTAINS PEBBLES UP TO 4 IN. WIDE. FROM 250 - 410 FEET. TRACES OF LIGNITE THROUGHOUT

HETEROSTEGINA ZONE:

SAND: CLEAR, PARTLY FINE TO MEDIUM GRAINED ANGULAR, GLASSY, PARTLY MEDIUM TO COARSE GRAINED, ROUNDED AND FROSTED

LIMESTONE: WHITE TO GRAY, BIOCLASTIC TO CHALKY, VERY FOSSILIFEROUS

LOWER CATAHOULA:

SAND: CLEAR, VERY FINE TO COARSE GRAINED, TRACES OF PYRITE AND LIGNITE.

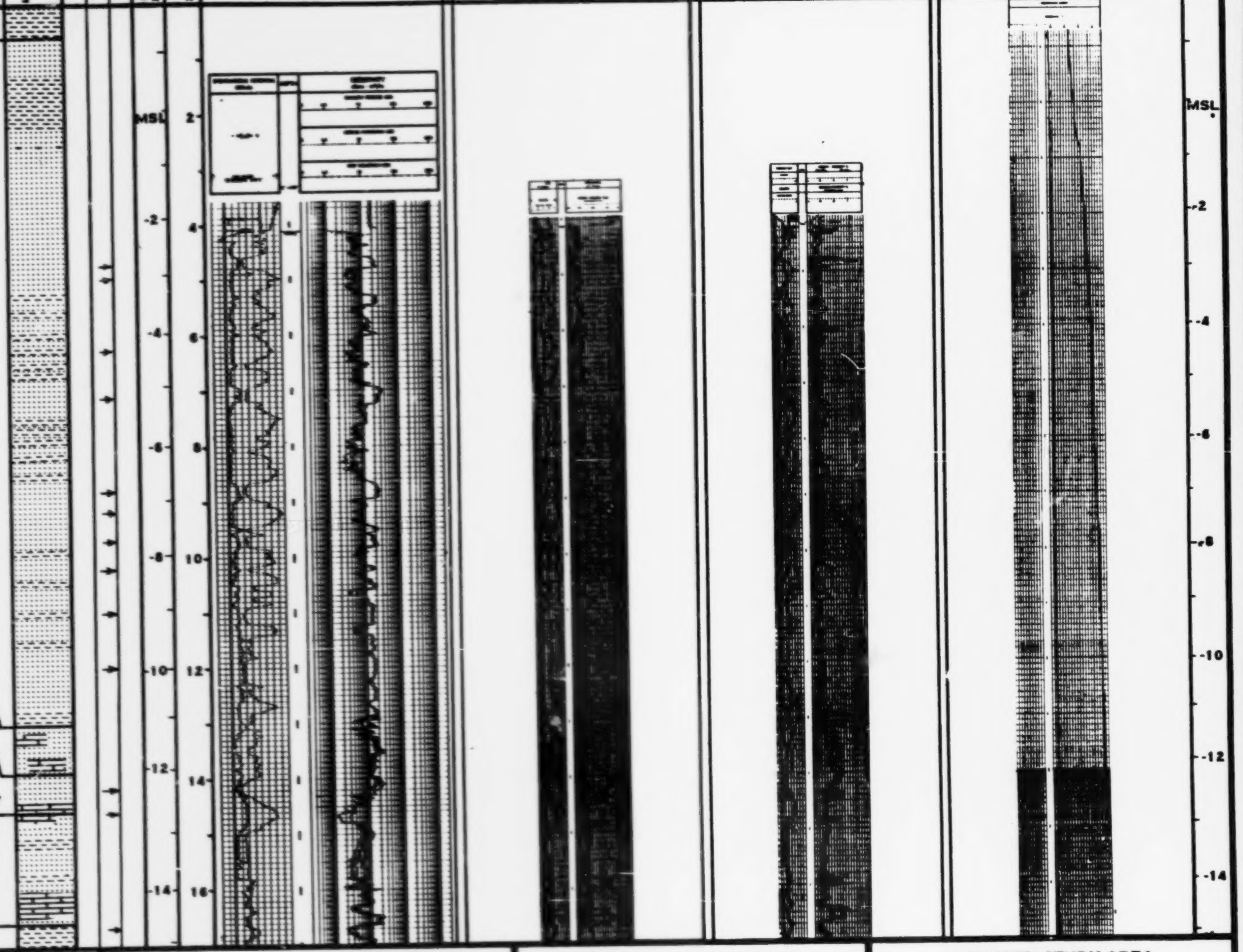
LIMESTONE: WHITE TO GRAY, CHALKY, FOSSILIFEROUS LOCALLY POROUS AND FRIABLE

CHICKASAWHAY

SAND: CLEAR, VERY FINE TO MEDIUM GRAINED

LIMESTONE: WHITE, CHALKY, BIOCLASTIC, LOCALLY CALCARENITIC, PARTLY VERY POROUS

*2 *3 SEE NEXT PAGE



ELEVATION (FT.): GL 196.89 KB 206.73 TOTAL DEPTH (FT.) 2997.22
DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED
LOCATION: NW/NE, SEC. 33, T3N, R10W, PERRY CO., MISSISSIPPI
NOTE: HOLE PLUGGED BACK TO 2683.5 FT.

- *1 CITRONELLE FORMATION
- *2 VICKSBURG GROUP
- *3 BUCATUNNA FORMATION
- *4 MOODYS BRANCH FORMATION
- *5 WINONA FORMATION

PREPARED J.D.G. DATE 12/22/80
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED GHF DATE 12/22/80

T-1598A-0

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA . GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX A-1
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DOE USA MCCG-2

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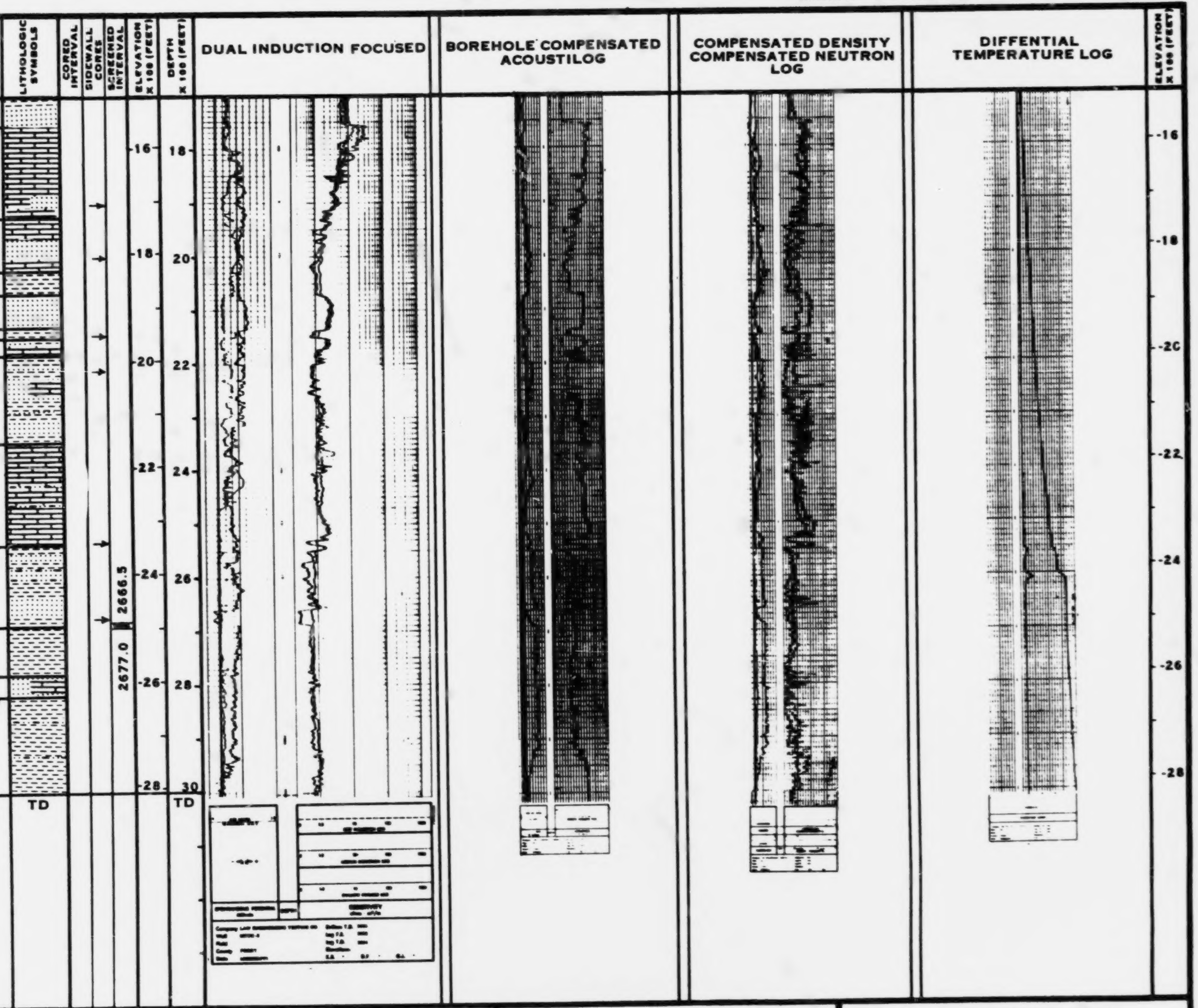
GROUP	FORMATION	LITHOLOGY
VICKSBURG	*3	CLAY: YELLOW-GRAY AND OLIVE-GRAY, POSSIBLY BENTONITIC, LOCALLY FOSSILIFEROUS SAND: CLEAR, COARSE TO VERY FINE GRAINED, CALCAREOUS, LOCALLY CARBONACEOUS
		LIMESTONE: WHITE, CHALKY, CALCARENITIC, LOCALLY MICROCRYSTALLINE, FOSSILIFEROUS, GLAUCONITIC, WITH MINOR SAND, CLAY, MUDSTONE, AND DOLMITE.
	RED BLUFF	CLAY: YELLOWISH GRAY, CALCAREOUS SAND: CLEAR TO WHITE, COARSE TO VERY FINE GRAINED, GLAUCONITIC LIMESTONE: WHITE TO GRAY, BIOCLASTIC CALCARENITE, WITH ABUNDANT FORAMINIFERA AND UNIDENTIFIED SHELL FRAGMENTS
JACKSON	YAZOO	CLAY: YELLOWISH GRAY, CALCAREOUS, FOSSILIFEROUS COCOA SAND MEMBER: SAND: CLEAR, MEDIUM TO VERY FINE GRAINED, CALCAREOUS, FOSSILIFEROUS, GLAUCONITE WITH MINOR LIMESTONE, CLAY, MUDSTONE, AND LIGNITE NORTH TWISTWOOD CREEK CLAY MEMBER:
	*4	CLAY: LIGHT OLIVE-GRAY, WAXY, SLIGHTLY CALCAREOUS
CLAIBORNE	COCKFIELD	SAND: CLEAR FINE AND VERY FINE GRAINED LIMESTONE: WHITE, CHALKY, PART CALCARENITE, FOSSILIFEROUS, GLAUCONITIC MUDSTONE: LIGHT BROWN, SILTY, CALCAREOUS, PYRITIC CLAY: YELLOWISH GRAY AND LIGHT BROWN, WAXY SAND: CLEAR, VERY FINE TO MEDIUM GRAINED, FOSSILIFEROUS WITH ABUNDANT GLAUCONITIC PELLETS, MINOR LIMESTONE, MUDSTONE, AND PYRITE
	COOK MOUNTAIN	LIMESTONE: WHITE TO GRAY, CHALK AND BIOCLASTIC CALCARENITE WITH ABUNDANT FORAMINIFERA AND UNIDENTIFIED SHELL FRAGMENTS, MINOR AMOUNTS OF SAND CLAY, MUDSTONE AND SHALE
	KOSCIUSKO (SPARTA)	CLAY: LIGHT OLIVE-GRAY AND YELLOWISH GRAY, SILTY, PART BENTONITIC, NON-CALCAREOUS SAND: CLEAR, WHITE, AND GRAY, FINE TO VERY FINE GRAINED, ARGILLACEOUS, GLAUCONITIC, FOSSILIFEROUS, PARTLY CALCAREOUS
	ZILPHA	CLAY: YELLOWISH GRAY, GLAUCONITIC, LOCALLY FOSSILIFEROUS, PYRITIC. MUDSTONE: BROWN, SILTY, CALCAREOUS.
	*5	LIMESTONE: WHITE, CRYSTALLINE, FOSSILIFEROUS. SAND: CLEAR TO PALE GREEN, VERY FINE GRAINED, CALCAREOUS, GLAUCONITIC
	TALLAHATTA	CLAY: YELLOWISH GRAY AND TAN POSSIBLY BENTONITIC, FOSSILIFEROUS. SHALE: BUFF, SILTY HARD CALCAREOUS MUDSTONE: BROWN, SILTY, FOSSILIFEROUS



ELEVATION (FT.): GL 186.89 KB 206.73 TOTAL DEPTH (FT.) 2887.22

DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED

LOCATION: NW/NE SEC. 33, T3N, R10W, PERRY CO., MISSISSIPPI

HYDROLOGIC DATA:
1. TOTAL DISSOLVED SOLIDS: 107,000 MG/L
2. MAXIMUM TEMPERATURE: 86°F (DURING DRILLING)
3. ELEVATION, BASE OF FRESH WATER: -1063 FT MSL

PREPARED	J.D.G.	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GHF	DATE	12/22/80

T-1598B-0

NATIONAL WASTE TERMINAL STORAGE PROGRAM
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LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

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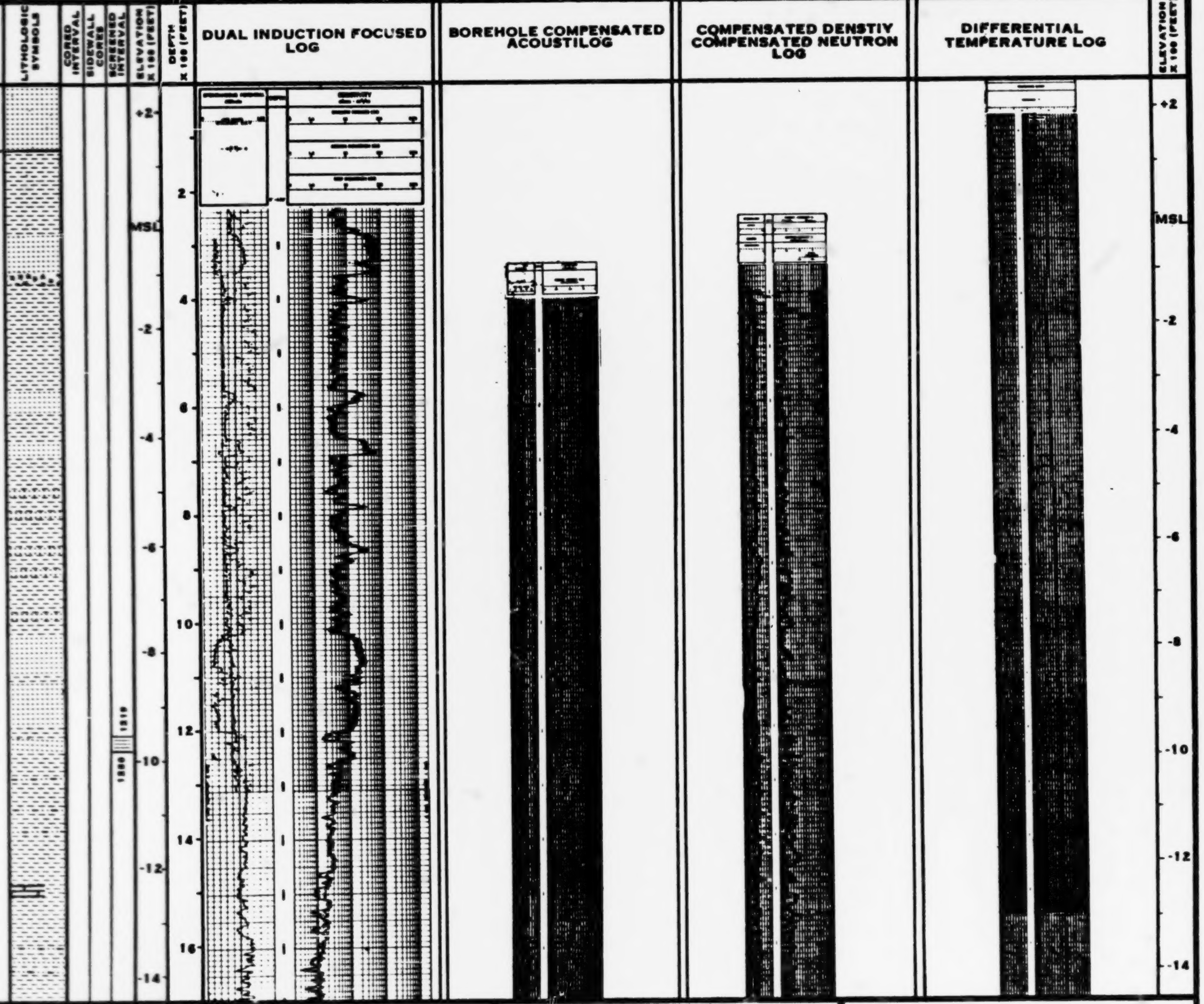
BEST DOCUMENT AVAILABLE

GROUP	FORMATION	LITHOLOGY
	CITRONELLE	SAND: WHITE TO BROWN, FINE TO COARSE GRAINED
	HATTIESBURG - CATAHOULA	INTERBEDDED SAND AND CLAY WITH PROMINENT GRAVEL BEDS IN THE UPPER 400 FEET. THE SAND IS WHITE, VERY FINE TO COARSE GRAINED, AND BECOMES LOCALLY CALCAREOUS AND FOSSILIFEROUS BELOW 1000 FEET. THE CLAY IS LIGHT OLIVE GRAY AND HIGHLY PLASTIC.



ELEVATION (FT.): GL 257.80 KB 267.88 **TOTAL DEPTH (FT.)** 4100.29

DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED

LOCATION: SE/SE,SEC. 33, T2N, R10W, PERRY CO., MISSISSIPPI

HYDROLOGIC DATA:
1. TOTAL DISSOLVED SOLIDS: 206,000 MG/L
2. MAXIMUM TEMPERATURE: 77° F (DURING DRILLING)
3. ELEVATION, BASE OF FRESH WATER: -1512 MSL

PREPARED J.D.G.	DATE 12/22/80
REVISED	DATE
REVISED	DATE
APPROVED GHF	DATE 12/22/80

T-1599A-0

NATIONAL WASTE TERMINAL STORAGE PROGRAM
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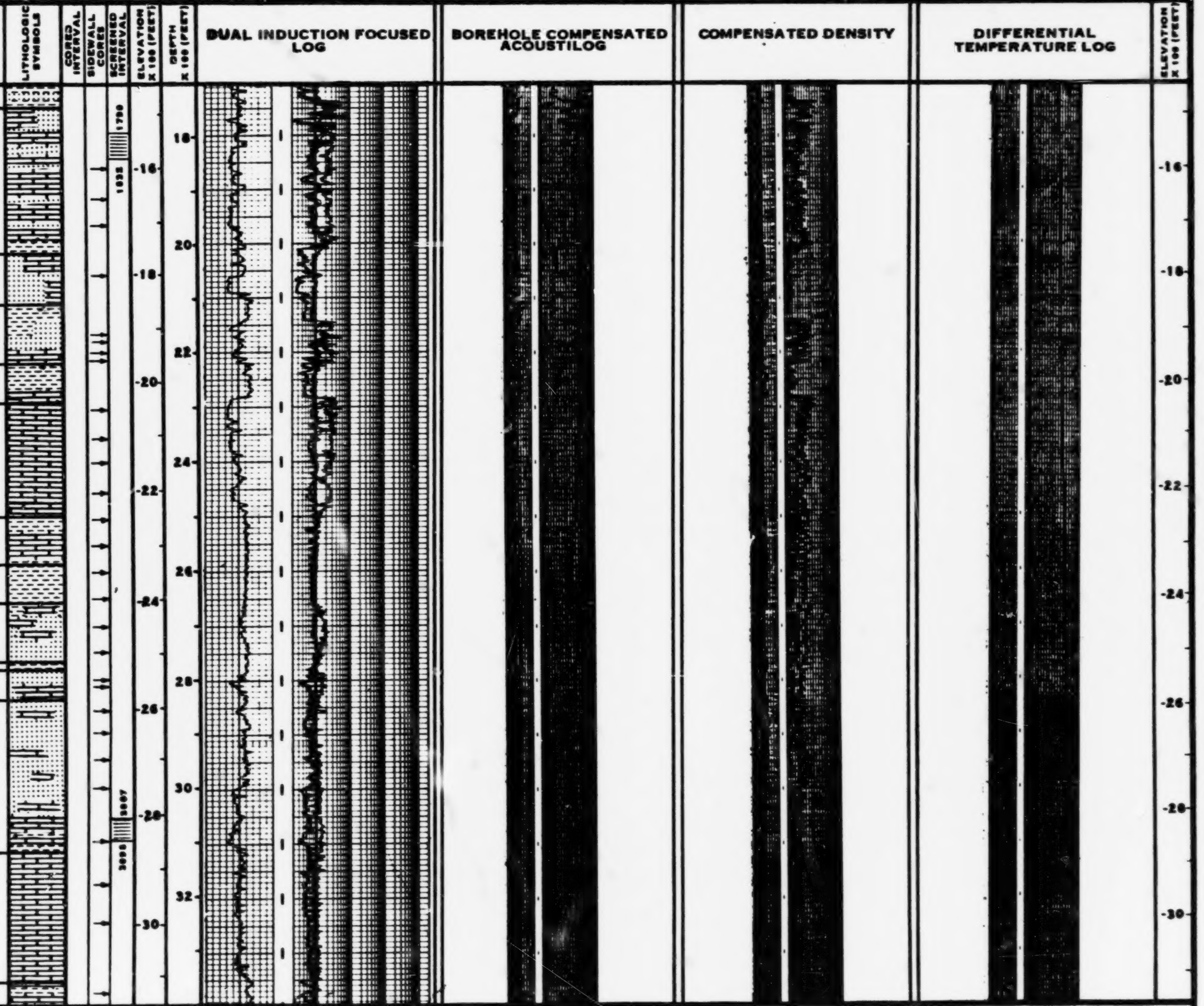
[redacted]

GROUP	FORMATION	LITHOLOGY
		SEE PRECEEDING SHEET
	HATTIESBURG - CATAHOULA	HETEROSTEGINIA ZONE: LIMESTONE: GRAY TO WHITE, CHALKY, FOSSILIFEROUS. SANDSTONE: WHITE, FINE TO COARSE GRAINED, PYRITIC
		LOWER CATAHOULA: LIMESTONE: GRAY, CHALKY AND UNCONSOLIDATED SAND: MEDIUM TO COARSE GRAINED WITH SHELL FRAGMENTS
	CHICKASAWHAY	SAND: WHITE, FINE TO MEDIUM GRAINED LIMESTONE: CHALKY AND FOSSILIFEROUS CLAY: LIGHT OLIVE-GRAY
VICKSBURG	*1	CLAY: GRAY, BENTONITIC WITH TRACES OF LIGNITE, PYRITE, LIMESTONE, AND SAND
		LIMESTONE: LIGHT GRAY, FOSSILIFEROUS, BIOCLASTIC CALCARENITIC
	RED BLUFF	LIMESTONE: GRAY, FOSSILIFEROUS, WITH INTERBEDDED OLIVE-GRAY CLAY
JACKSON	YAZOO	CLAY: LIGHT OLIVE-GRAY, FOSSILIFEROUS
		PACHUTA MARL MEMBER: LIMESTONE: GRAY, FOSSILIFEROUS AND GLAUCONITIC SAND: LIGHT GRAY, FINE AND MEDIUM GRAINED
		NORTH TWISTWOOD CREEK MEMBER-CLAY: LIGHT OLIVE-GRAY, GLAUCONITIC
	*2	LIMESTONE: GRAY TO WHITE, FOSSILIFEROUS, GLAUCONITIC SAND: GRAY, FINE GRAINED
CLAIBORNE	COCKFIELD	SAND: GRAY, FINE TO COARSE GRAINED, INTERBEDDED WITH FOSSILIFEROUS LIMESTONE WITH ABUNDANT GLAUCONITE PELLETS, AND GRAY AND RED-BROWN MOTTLED CLAY
	COOK MOUNTAIN	LIMESTONE: LIGHT GRAY, SANDY, CALCARENITE WITH ABUNDANT MICROFOSSILS AND GLAUCONITE PELLETS
	*3	SEE NEXT SHEET



ELEVATION (FT.): GL 257.80 KB 267.88 TOTAL DEPTH (FT.) 4100.29
DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED
LOCATION: SE/SE,SEC. 33, T2N, R10W, PERRY CO., MISSISSIPPI

NOTES:
*1 BUCATUNNA FORMATION
*2 MOODYS BRANCH FORMATION
*3 KOSCIUSKO (SPARTA) FORMATION
*4 ZILPHA FORMATION
*5 WINONA FORMATION
*6 WILCOX GROUP

PREPARED	J.D.G.	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GHF	DATE	12/22/80

T-15998-0

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA, GEORGIA

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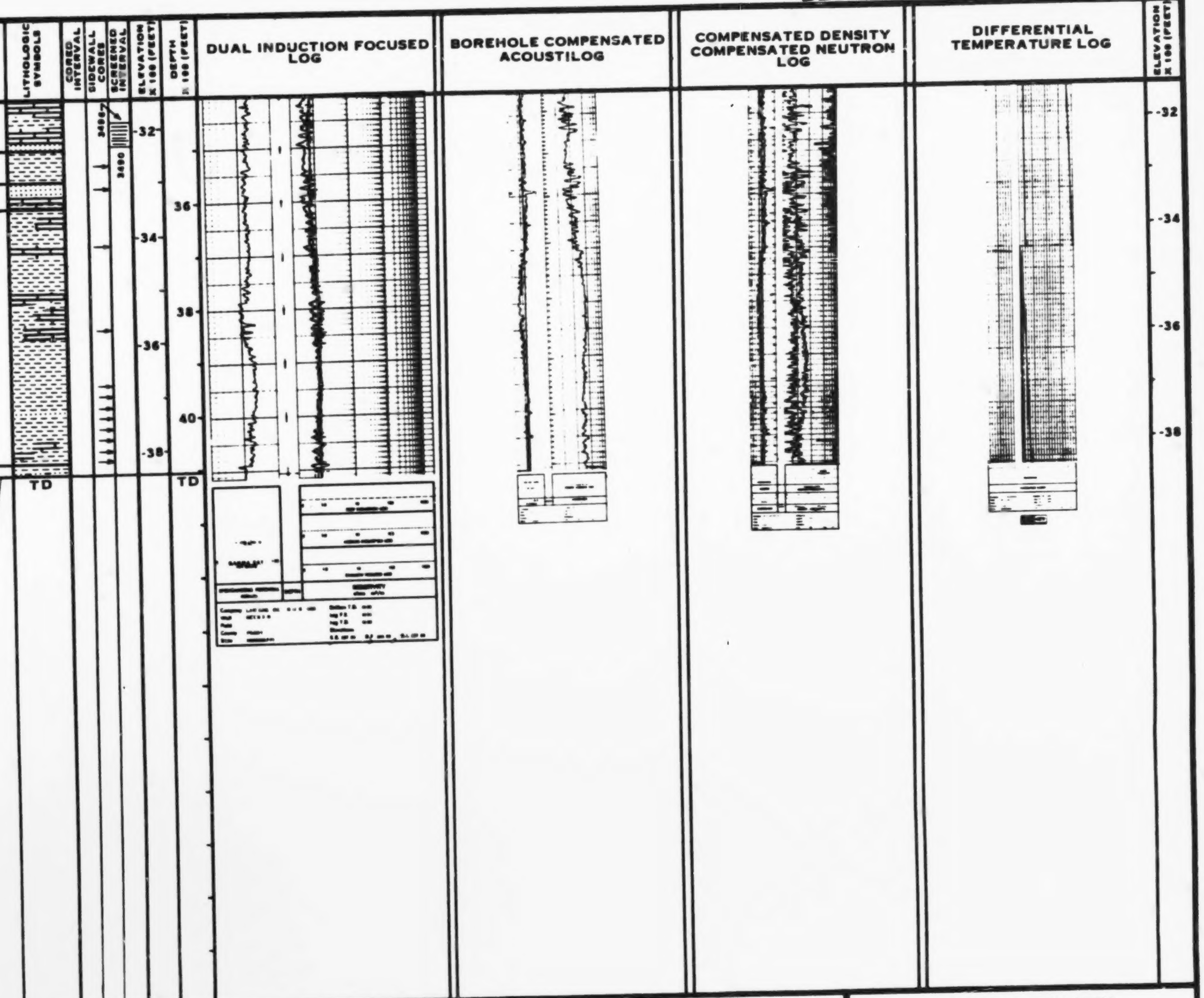
GROUP	FORMATION	LITHOLOGY
CLAIBORNE	*3	INTERBEDDED OLIVE-GRAY CLAY, GRAY LIMESTONE AND GLAUCONITIC SHALE WITH THIN, FINE TO COARSE GRAINED SAND BEDS IN THE LOWER PART. PYRITE IS COMMON
	*4	CLAY: LIGHT OLIVE GRAY AND DARK GRAY, MOTTLED SHALE: GREENISH GRAY WITH ABUNDANT GLAUCONITIC
	*5	SAND: LIGHT GRAY AND GREEN, FINE TO COARSE GRAINED, GLAUCONITIC LIMESTONE: PALE BROWN, MICROCRYSTALLINE WITH INTERBEDDED OLIVE GRAY CLAY
	TAL LAHATTA	SHALE: PALE BROWN AND GREENISH GRAY, LOCALLY CALCAREOUS LIMESTONE: LIGHT GRAY, MICROCRYSTALLINE, LOCALLY SANDY, FOSSILIFEROUS, WITH ABUNDANT GLAUCONITE CLAY: OLIVE-GRAY AND LIGHT OLIVE-GRAY
	*6	GEOPHYSICAL LOGS SUGGEST THAT THE UPPER 10 FEET OF THE WILCOX GROUP MAY HAVE BEEN PENETRATED. VERIFICATION IS LACKING. DEEPEST SAMPLE CONTAINS LIGHT OLIVE-GRAY CLAY, GRAY CALCARENITE, COARSE GRAINED SAND



ELEVATION (FT.): GL 257.80 KB 267.88 TOTAL DEPTH (FT.) 4100.29
DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED
LOCATION: SE/SE, SEC. 33, T2N, R10W, PERRY CO., MISSISSIPPI

PREPARED J.D.G. DATE 12/22/80
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED GHE DATE 12/22/80

T-1599C-0

NATIONAL WASTE TERMINAL STORAGE PROGRAM
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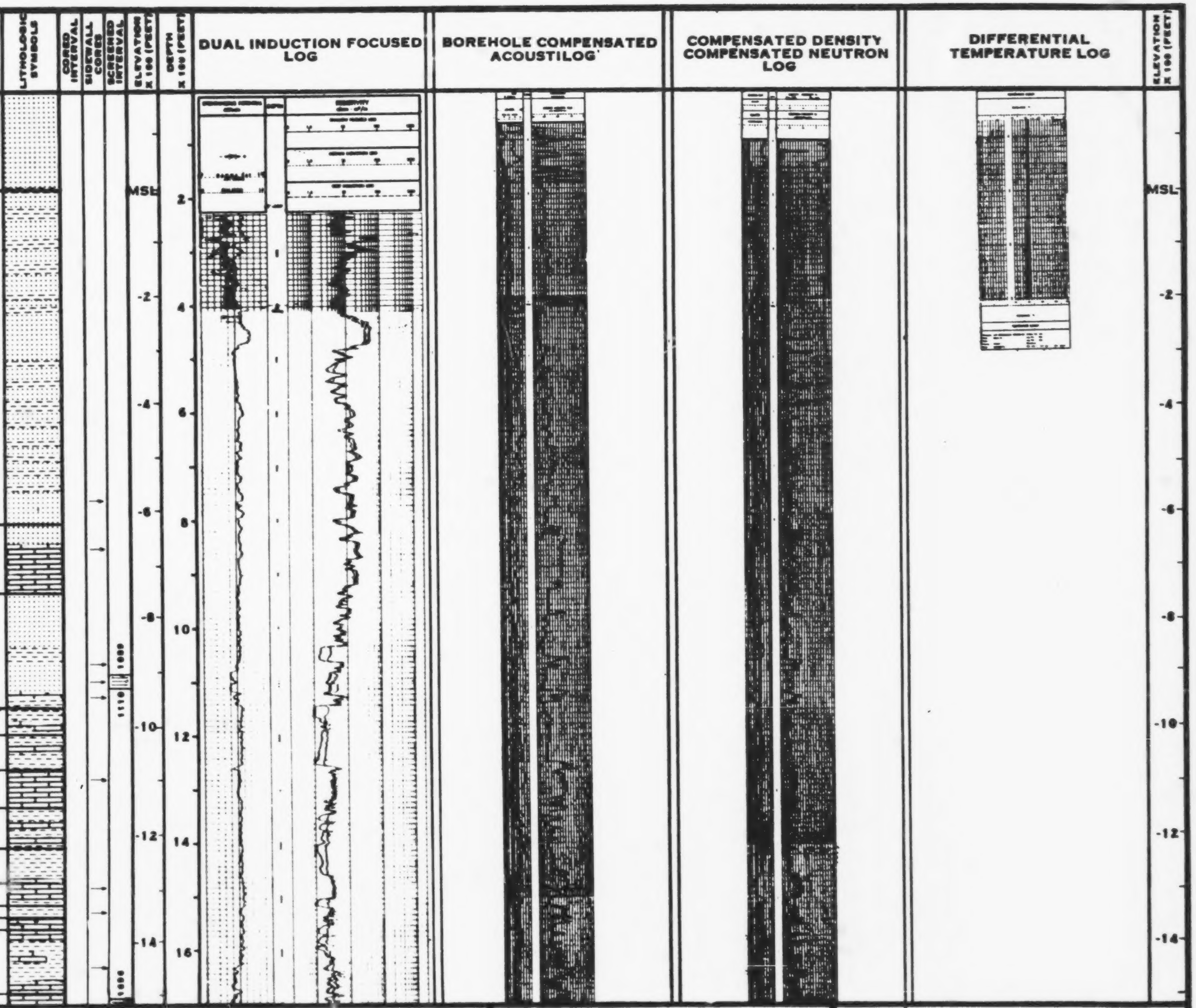
GROUP	FORMATION	LITHOLOGY
	CITRONELLE	SAND: YELLOW-BROWN, MEDIUM-GRAINED WITH LOCAL GRANULAR LENSES
	HATTIESBURG - CATAHOULA	INTERBEDDED UNCONSOLIDATED SAND AND CLAY WITH GRAVEL BEDS IN THE UPPER 120 FEET SANDS: WHITE TO LIGHT GRAY, VERY FINE TO MEDIUM GRAINED, LOCALLY CALCAREOUS. CLAYS: GRAY, GREENISH GRAY AND PALE RED, PLASTIC, POSSIBLY BENTONITIC
		HETEROSTEGINA ZONE: LIMESTONE: WHITE, CHALKY, SANDY, FOSSILIFEROUS, WITH ABUNDANT FECAL PELLETS. SANDSTONE: WHITE, FINE GRAINED, CALCAREOUS, WITH NUMEROUS FOSSIL SHELL FRAGMENTS.
		LOWER CATAHOULA: SANDSTONE: WHITE, VERY FINE TO MEDIUM GRAINED, CALCAREOUS. CLAY: PALE BROWN TO GRAY, WITH INTERBEDDED WHITE, CHALKY, FOSSILIFEROUS LIMESTONE
	*1	LIMESTONE: WHITE TO GRAY, SANDY, CHALKY, FOSSILIFEROUS LIMESTONE CLAY: TAN TO BROWN, GLAUCONITIC
VICKSBURG	*2	LIMESTONE: WHITE TO GRAY, SANDY, CHALKY, FOSSILIFEROUS, GRADES DOWNWARD INTO: CLAYS: GRAY, POSSIBLY BENTONITIC
	*3	LIMESTONE: WHITE, SANDY, GLAUCONITIC BIOCLASTIC CALCARENITE WITH ABUNDANT FORAMINIFERA CLAY: GRAY AND GREENISH GRAY
	*4	LIMESTONE: WHITE TO GRAY, CHALKY, FOSSILIFEROUS, WITH ABUNDANT GLAUCONITE AND FECAL PELLETS. CLAY: LIGHT BROWN TO GRAY, WITH ABUNDANT FORAMINIFERA AND A TRACE OF LIGNITE
JACKSON	YAZOO	PACHUTA MARL MEMBER: LIMESTONE: WHITE TO GRAY, BIOCLASTIC, CHALKY, GLAUCONITIC, FOSSILIFEROUS. NORTH TWISTWOOD CREEK CLAY MEMBER CLAY: PALE BROWN AND LIGHT OLIVE-GRAY GLAUCONITIC FOSSILIFEROUS.
	*5	LIMESTONE: WHITE TO OLIVE-GREEN, CHALKY, SILTY, ARGILLACEOUS, FOSSILIFEROUS.
CLAIBORNE	*6	CLAY: LIGHT BROWN AND GREEN, GLAUCONITIC, LIMESTONE: WHITE TO LIGHT GREEN, ARGILLACEOUS, SANDY, FOSSILIFEROUS, WITH ABUNDANT FORAMINIFERA
	*7	SEE NEXT PAGE



ELEVATION (FT.): GL 193.3 KB 196.3 TOTAL DEPTH (FT.) 2700.65
DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED
LOCATION: SW/NE, SEC. 3, T3N, R10W, PERRY CO., MISSISSIPPI

NOTE:
- *1 CHICKASAWHAY FORMATION
- *2 BUCATUNNA FORMATION
- *3 VICKSBURG LIMESTONES
- *4 RED BLUFF FORMATION
- *5 MOODYS BRANCH FORMATION
- *6 COCKFIELD FORMATION
- *7 COOK MOUNTAIN FORMATION
- *8 WINONA FORMATION

PREPARED	J.D.G.	DATE	12/22/80
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REVISED		DATE	
APPROVED	GHF	DATE	12/22/80

T-1600A-0

NATIONAL WASTE TERMINAL STORAGE PROGRAM
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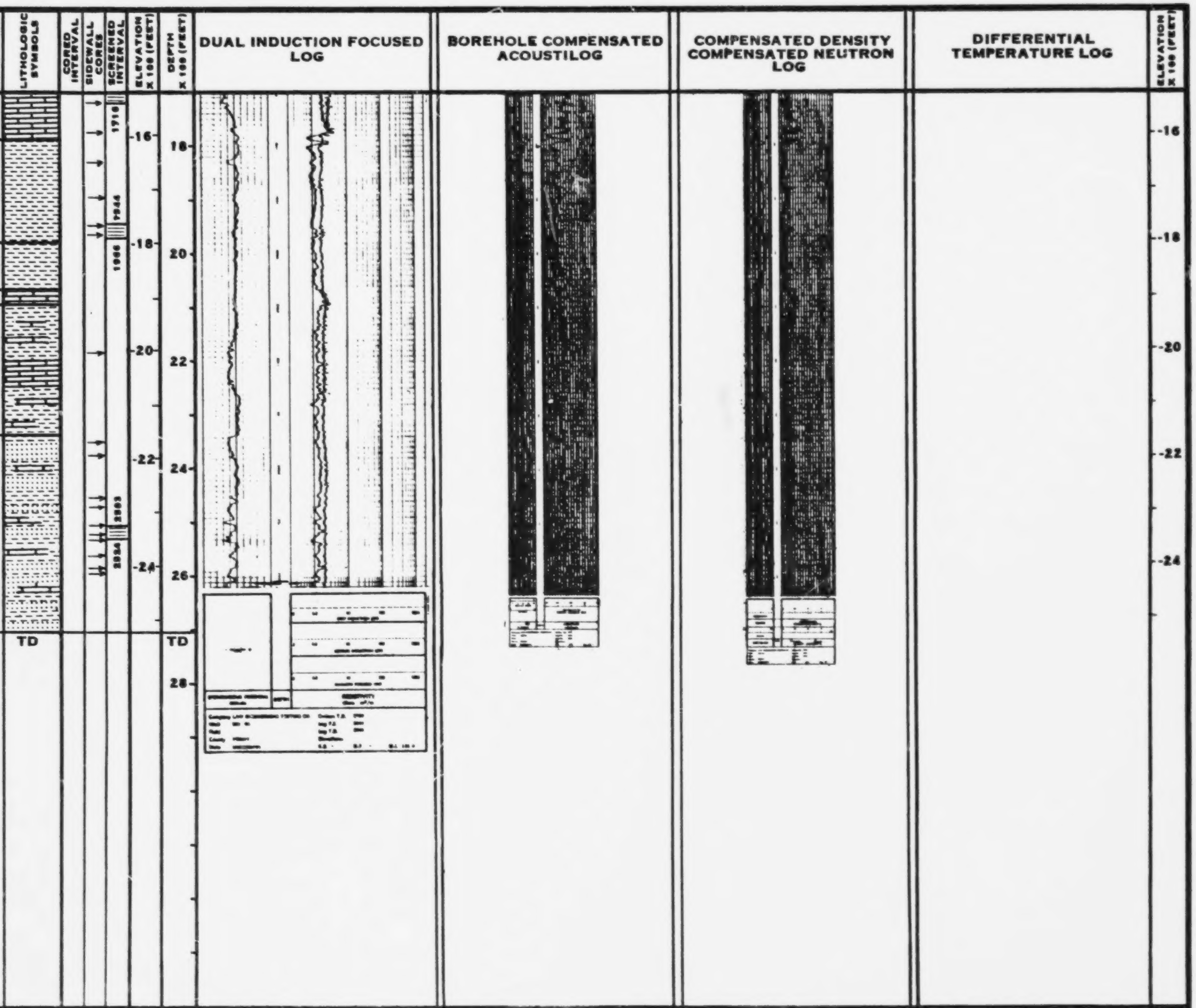
GROUP	FORMATION	LITHOLOGY
CLAIBORNE	*7	LIMESTONE: WHITE AND LIGHT GRAY, CHALKY, SANDY, GLAUCONITIC, WITH ABUNDANT LARGE FORAMINIFERA
	KOSCIUSKO (SPARTA)	CLAY: GRAY AND BROWN, GLAUCONITIC. SHALE: BROWN AND GREEN, SILTY TO SANDY, CALCAREOUS, GLAUCONITIC AND FOSSILIFEROUS.
	ZILPHA	CLAY AND SHALE: GREEN AND BROWN, WITH ABUNDANT GLAUCONITE
	*8	LIMESTONE: LIGHT GRAY, LIGHT BROWN AND LIGHT GREEN, MARLY, VERY GLAUCONITIC.
	TALLAHATTA	SAND: (TRACE) CLEAR, VERY FINE AND FINE GRAINED WITH ABUNDANT FOSSIL FRAGMENTS. SHALE: BROWN AND GREEN, SILTY, LOCALLY SANDY, CALCAREOUS. LIMESTONE: WHITE, LIGHT GREEN AND LIGHT GRAY, CHALKY, SANDY.
WILCOX		CLAY: GRAY, BROWN, AND GREEN, LOCALLY CARBONACEOUS SAND: CLEAR AND GREEN, VERY FINE TO MEDIUM GRAINED, GENERALLY UNCONSOLIDATED, BUT LOCALLY WITH CALCITIC CEMENT, GLAUCONITIC LIMESTONE: (MARL) LIGHT GRAY, LIGHT BROWN AND GREEN, ARGILLACEOUS, SANDY, FOSSILIFEROUS, LOCALLY VERY GLAUCONITIC.



ELEVATION (FT.): GL 183.3 KB 193.6 TOTAL DEPTH (FT.) 2700.65
DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED
LOCATION: SW/NE, SEC. 3, T3N, R10W, PERRY CO., MISSISSIPPI
HYDROLOGIC DATA:
1. TOTAL DISSOLVED SOLIDS: 22,200 MG/L
2. MAXIMUM TEMPERATURE, 70°F (DURING DRILLING)
3. ELEVATION, BASE OF FRESH WATER: -367 FT MSL

PREPARED	J.D.G.	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GHF	DATE	12/22/80

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NATIONAL WASTE TERMINAL STORAGE PROGRAM
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FORMATION

LITHOLOGY

SAND: WHITE, CLEAR, PINK AND ORANGE, VERY FINE TO COARSE GRAINED, LOCALLY HEMATITIC

SILTSTONE: PINK, WHITE, AND BUFF, SANDY, ARGILLACEOUS. TRACES OF GRAVEL, 2 - 4 MM., WELL ROUNDED QUARTZ GRAINS

HATTIESBURG - CATAHOULA

SAND: CLEAR, VERY FINE TO COARSE GRAINED, LOCALLY VERY COARSE GRAINED IN UPPER 100', PREDOMINANTLY WELL ROUNDED AND FROSTED.

CLAY: LIGHT GRAY, LIGHT BROWN, AND LIGHT OLIVE GRAY, PARTLY MOTTLED, PLASTIC.

SILTSTONE: WHITE LIGHT BROWN, AND GRAY GREEN, FRIABLE, LOCALLY VERY SANDY. ARGILLACEOUS

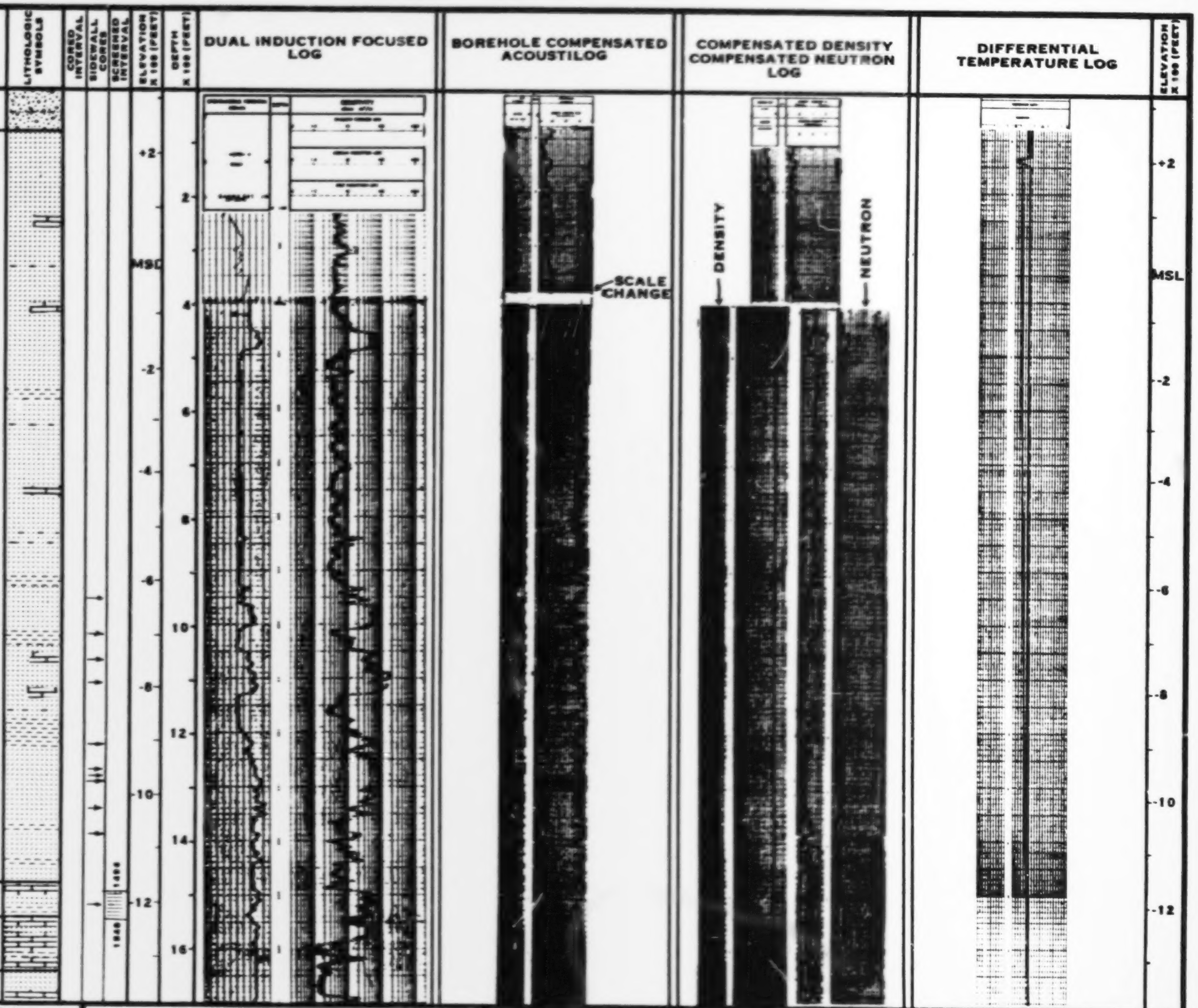
LIMESTONE (TRACE): MOTTLED GRAY-BROWN, MARLY, FOSSILIFEROUS.

HETEROSTEGINA ZONE:
LIMESTONE: WHITE, CRYSTALLINE AND MICROCRYSTALLINE, FOSSILIFEROUS.
SAND: CLEAR, FINE AND VERY FINE GRAINED.
CLAY: YELLOWISH GRAY, SLIGHTLY SILTY.

LOWER CATAHOULA:
SAND: CLEAR, FINE AND VERY FINE GRAINED
CLAY: GRAY, NON-CALCAREOUS.
LIMESTONE: WHITE, SANDY, CALCARENITIC, FOSSILIFEROUS.

*1

CLAY: GRAY AND BROWNISH GRAY
SAND: CLEAR SOME BLACK, FINE AND VERY FINE GRAINED, PARTLY SILTY.
LIMESTONE (MINOR): WHITE, SANDY, FOSSILIFEROUS.



ELEVATION (FT.): GL 315.0 KB 326.1 TOTAL DEPTH (FT.) 3589.3
DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED
LOCATION: NW/SE, SEC. 4, T1N, R13W, PERRY CO., MISSISSIPPI
HYDROLOGIC DATA:
1. TOTAL DISSOLVED SOLIDS: 53,200 MG/L
2. MAXIMUM TEMPERATURE: 108°F (DURING DRILLING)
3. ELEVATION, BASE OF FRESH WATER: -1326 FT MSL

PREPARED J.D.G. DATE 12/22/80
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED GHF DATE 12/22/80
T-1601A-0

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BEST DOCUMENT AVAILABLE

LITHOLOGY

VICKSBURG

*1

*2 CLAY: GRAY, GLAUCONITIC.

LIMESTONE: WHITE, SANDY CALCARENITE, GRADING TO CALCAREOUS SANDSTONE. ABUNDANT FORMINIFERA, FAIRLY VUGGY POROSITY

*3 CLAY: GRAY, YELLOWISH GRAY, AND BROWNISH GRAY, PLASTIC, VERY CALCAREOUS.

LIMESTONE: WHITE, SANDY, FOSSILIFEROUS.

YAZOO

SAND: CLEAR AND GRAY, VERY FINE GRAINED

CLAY: GRAY AND YELLOWISH GRAY, SILTY, CALCAREOUS, FOSSILIFEROUS.

PACHUTA MARL MEMBER:

CLAY: GRAY AND BROWNISH GRAY, CALCAREOUS

LIMESTONE: WHITE AND LIGHT GRAY BIOCLASTIC CALCARENITE.

*4 CLAY: GRAY, FOSSILIFEROUS, GLAUCONITIC.

*5

CLAIBORNE

*6 CLAY: OLIVE-GRAY, GLAUCONITIC, CALCAREOUS.

LIMESTONE: WHITE, SANDY, GLAUCONITIC, FOSSILIFEROUS

COOK MTN

LIMESTONE: WHITE AND GRAY, SANDY, GLAUCONITIC, FOSSILIFEROUS.

SANDSTONE: GREEN AND DARK GREENISH GRAY, FINE AND VERY FINE GRAINED, GLAUCONITIC.

CLAY: GRAY, GLAUCONITIC, CONTAINING ABUNDANT FECAL PELLETS

LIMESTONE: WHITE AND LIGHT GRAY SANDY CALCARENITE, GLAUCONITIC, VERY FOSSILIFEROUS

KOSCIUSKO (SPARTA)

LIMESTONE: WHITE SANDY CALCARENITIC, GLAUCONITIC, AND FOSSILIFEROUS.

CLAY: GRAY, OLIVE-GRAY, AND GRAY-BROWN, SILTY, SANDY, CALCAREOUS, FOSSILIFEROUS

SAND: WHITE, LOCALLY BLACK, FINE AND VERY FINE GRAINED, PARTLY VERY SILTY, CONSISTS OF QUARTZ, CALCITE AND GLAUCONITIC GRAINS, FOSSILIFEROUS

*7 CLAY: BROWN AND OLIVE-GRAY, GLAUCONITIC, PYRITIC, AND FOSSILIFEROUS

*8

TALLAHATTA

CLAY: BROWN AND BROWNISH BLACK, SILTY, CALCAREOUS, AND FOSSILIFEROUS

SILTSTONE: LIGHT GRAY, LIGHT OLIVE-GRAY, AND DARK GREEN, ARGILLACEOUS, SANDY, CALCAREOUS

CLAY: BROWN, DARK BROWN, AND BROWNISH GRAY, SOFT, WAXY, CALCAREOUS

SANDSTONE: WHITE AND LIGHT GRAY, FINE AND VERY FINE GRAINED, SILTY, GLAUCONITIC, CALCAREOUS, FOSSILIFEROUS,

WILCOX

LIMESTONE: WHITE, CHALKY, GLAUCONITIC, FOSSILIFEROUS.

SILTSTONE: LIGHT GRAY TO DARK GRAY, SANDY AND ARGILLACEOUS, GLAUCONITIC.

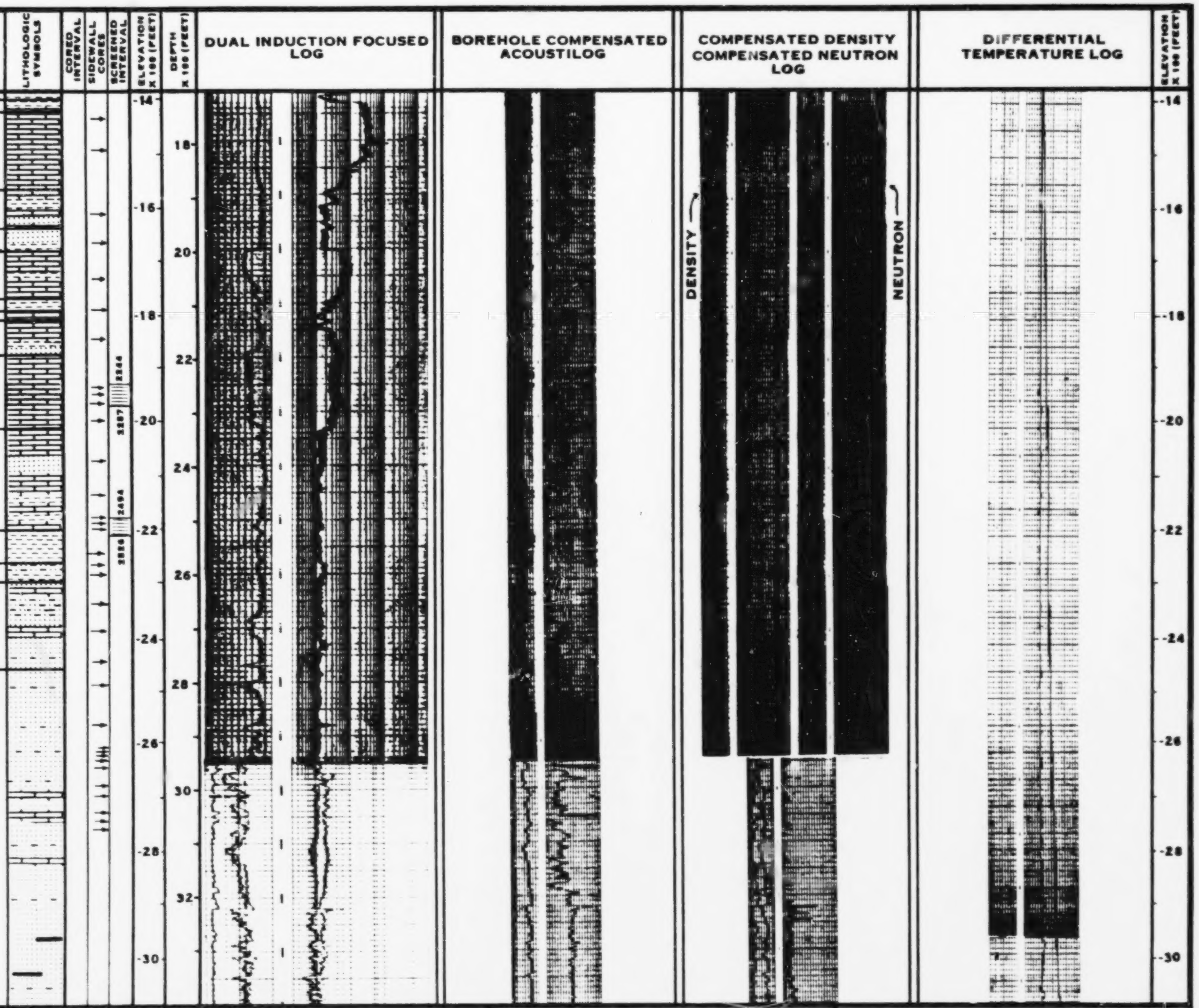
CLAY: BROWNISH GRAY, OLIVE-GRAY, AND OLIVE-BLACK, SOFT, LOCALLY FOSSILIFEROUS.

SAND (AND SANDSTONE): LIGHT GRAY, LIGHT OLIVE-GRAY, AND GREENISH GRAY, FINE AND VERY FINE GRAINED, SILTY, MICACEOUS.

LIMESTONE: WHITE, GRAY, PINK, PARTLY MICROCRYSTALLINE, PARTLY CHALKY, SILTY TO SANDY, FOSSILIFEROUS.

SILTSTONE: LIGHT GRAY TO DARK GRAY AND BROWN.

LIGNITE: BROWNISH BLACK, FIBROUS (TRACES)



ELEVATION (FT.): GL 313.8 KB 326.1 TOTAL DEPTH (FT.) 3589.3

DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED

LOCATION: NW/SE, SEC. 4, T1N, R13W, PERRY CO., MISSISSIPPI

NOTES:
- *1 CHICKASAWHAY FORMATION
- *2 BUCATUNNA FORMATION
- *3 RED BLUFF FORMATION
- *4 NORTH TWISTWOOD CREEK CLAY MEMBER
- *5 MOODYS BRANCH FORMATION
- *6 COCKFIELD FORMATION
- *7 ZILPHA FORMATION
- *8 WINONA FORMATION

PREPARED	J.D.G	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GHF	DATE	12/22/80

T-1601B-0

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX A-1
DEEP BORING DATA SUMMARY
DOE USA MH-5A

JOB NO. MV9700

TABLE NO. A-1.5
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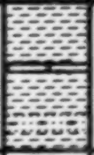
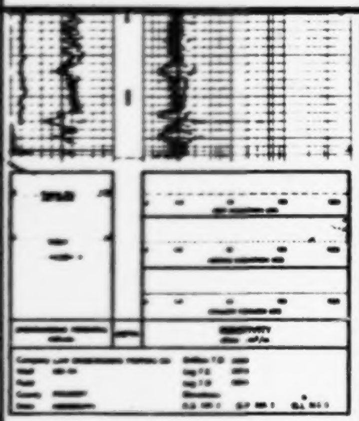
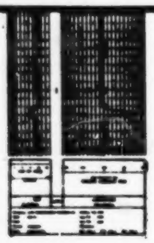
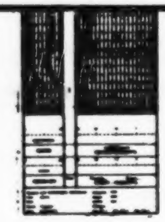
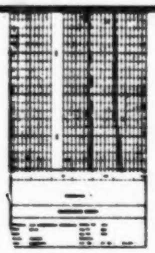
BEST DOCUMENT AVAILABLE

GROUP	FORMATION	LITHOLOGY	LITHOLOGIC SYMBOLS	CORED INTERVAL	SIDEWALL CORES	SCREENED INTERVAL	ELEVATION X 100 (FEET)	DEPTH X 100 (FEET)	DUAL INDUCTION FOCUSED LOG	BOREHOLE COMPENSATED ACOUSTILOG	COMPENSATED DENSITY COMPENSATED NEUTRON LOG	DIFFERENTIAL TEMPERATURE LOG	ELEVATION X 100 (FEET)
	WILCOX	CLAY: BROWNISH GRAY, OLIVE-GRAY, AND OLIVE-BLACK, SOFT, LOCALLY FOSSILIFEROUS. SAND (AND SANDSTONE): LIGHT GRAY, LIGHT OLIVE-GRAY, AND GREENISH GRAY, FINE AND VERY FINE GRAINED, SILTY MICACEOUS. LIMESTONE: WHITE, GRAY, PINK, PART MICROCRYSTALLINE PARTLY CHALKY, SILTY TO SANDY, FOSSILIFEROUS. SILTSTONE: LIGHT GRAY TO DARK GRAY AND BROWN LIGNITE: BROWNISH BLACK, FIBROUS (TRACES)				3530 3542	-32						-32
			TD					36 TD					

ELEVATION (FT.): GL 315.8 KB 326.1 TOTAL DEPTH (FT.) 3589.3
DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED
LOCATION: NW/SE, SEC. 4, T1N, R13W, PERRY CO., MISSISSIPPI

PREPARED JDG DATE 12/22/80
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED GHF DATE 12/22/80

T-1601C-0

NATIONAL WASTE TERMINAL
STORAGE PROGRAM
GEOLOGIC EVALUATION GULF
COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
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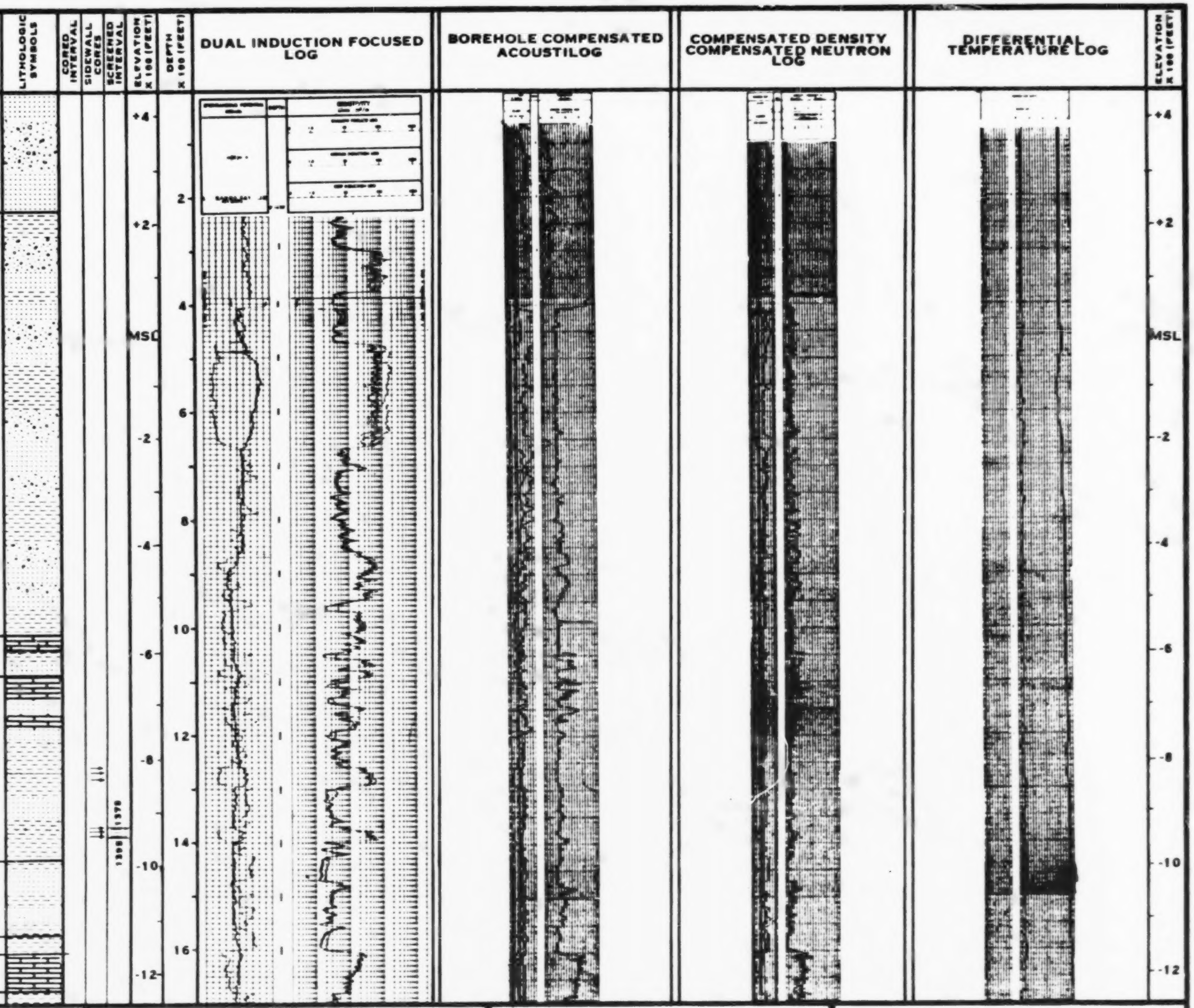
BEST DOCUMENT AVAILABLE

FORMATION	LITHOLOGY
CITRONELLE	SAND: CLEAR, MODERATE TO REDDISH ORANGE, PINK, AND YELLOW, VERY FINE TO VERY COARSE GRAINED. GRAVEL: VARICOLORED, 2 TO 20 MM. DIAMETER, QUARTZ, QUARTZITE, AND CHERT.
HATTIESBURG - CATAHOULA	CLAY: GRAYISH ORANGE, YELLOWISH GRAY, REDDISH BROWN AND PALE OLIVE-GRAY GRAVEL: VARICOLORED, 2 TO 20 MM. DIAMETER, SUB-ANGULAR TO WELL ROUNDED, MAINLY QUARTZ AND CHERT, OCCURRING MAINLY IN THE UPPER 100 FEET AND BETWEEN 500 - 670 FEET. SAND: CLEAR, WHITE, YELLOW, ORANGE AND PINK, VERY FINE TO VERY COARSE GRAINED, ANGULAR TO WELL ROUNDED, LOCALLY HEMATITIC. HETEROSTEGINA ZONE: LIMESTONE: WHITE TO LIGHT GRAY, BIOCLASTIC. CLAY: GRAY, BLUE-GRAY, AND OLIVE-GRAY, PARTLY MOTTLED, CALCAREOUS, FOSSILIFEROUS. SAND: CLEAR, VERY FINE TO VERY COARSE GRAINED, ANGULAR TO WELL ROUNDED. LOWER CATAHOULA: CLAY: LIGHT OLIVE-GRAY, PALE OLIVE, PALE YELLOWISH BROWN, PARTLY MOTTLED, CALCAREOUS IN THE UPPER 100 FT. LIMESTONE: WHITE AND LIGHT GRAY, BIOCLASTIC, SANDY, OCCURS IN THE UPPER 230 FEET. SAND: CLEAR TO WHITE, FINE AND MEDIUM GRAINED, LOCALLY CALCAREOUS.
CHICKASAWHAY	CLAY: OLIVE-GRAY, LIGHT OLIVE-GRAY, DARK YELLOWISH BROWN, AND MOTTLED, FOSSILIFEROUS. SAND: CLEAR, FINE TO VERY COARSE GRAINED, ANGULAR TO SUBROUNDED, PARTLY CALCAREOUS
*4	CLAY: DARK YELLOWISH BROWN AND DARK GREENISH GRAY.
*1	LIMESTONE: WHITE, BIOCLASTIC, GLAUCONITIC, LOCALLY HEMATITIC
*2	CLAY: YELLOWISH GRAY



ELEVATION (FT.): GL 445.02 KB 456.32 TOTAL DEPTH (FT.) 3500

DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED

LOCATION: SW/NE, SEC. 4, T5N, R17W, PERRY CO., MISSISSIPPI

NOTE:
*1 VICKSBURG LIMESTONES
*2 RED BLUFF FORMATION
*3 VICKSBURG GROUP
*4 PACHUTA MARL MEMBER
*5 NORTH TWISTWOOD CREEK CLAY MEMBER
*6 WINONA FORMATION

PREPARED J.D.G. DATE 12/22/80
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED GHF DATE 12/22/80
T-1602A-0

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
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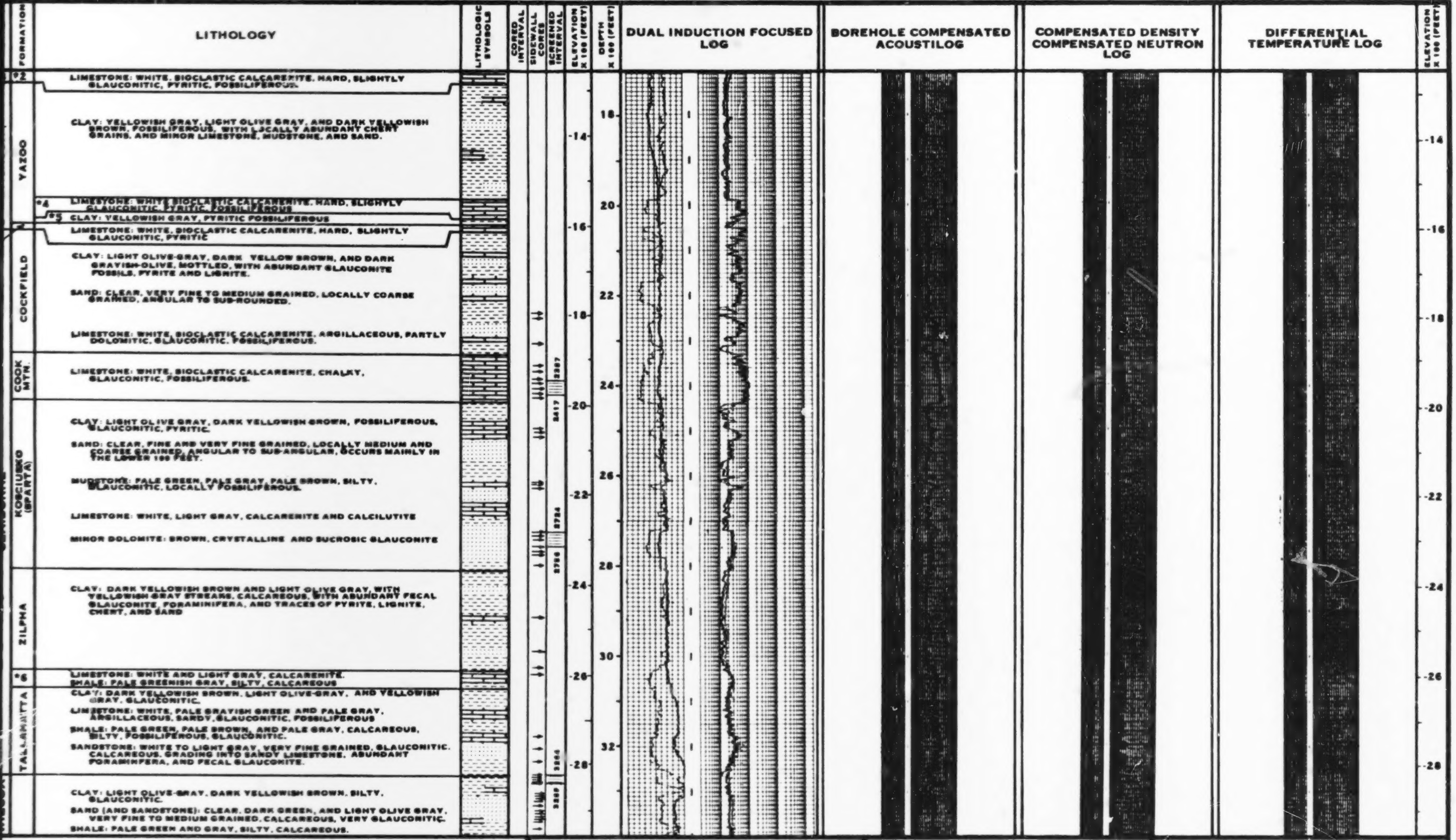

FORMATION	LITHOLOGY
*2	LIMESTONE: WHITE, BIOCLASTIC CALCARENITE, HARD, SLIGHTLY GLAUCONITIC, PYRITIC, FOSSILIFEROUS.
YAZOO	CLAY: YELLOWISH GRAY, LIGHT OLIVE GRAY, AND DARK YELLOWISH BROWN, FOSSILIFEROUS, WITH LOCALLY ABUNDANT CHERT GRAINS, AND MINOR LIMESTONE, MUDSTONE, AND SAND.
*4	LIMESTONE: WHITE, BIOCLASTIC CALCARENITE, HARD, SLIGHTLY GLAUCONITIC, PYRITIC, FOSSILIFEROUS
*5	CLAY: YELLOWISH GRAY, PYRITIC FOSSILIFEROUS
	LIMESTONE: WHITE, BIOCLASTIC CALCARENITE, HARD, SLIGHTLY GLAUCONITIC, PYRITIC
COCKFIELD	CLAY: LIGHT OLIVE-GRAY, DARK YELLOW BROWN, AND DARK GRAYISH-OLIVE, MOTTLED, WITH ABUNDANT GLAUCONITE FOSSILS, PYRITE AND LIGNITE. SAND: CLEAR, VERY FINE TO MEDIUM GRAINED, LOCALLY COARSE GRAINED, ANGULAR TO SUB-ROUNDED. LIMESTONE: WHITE, BIOCLASTIC CALCARENITE, ARGILLACEOUS, PARTLY DOLOMITIC, GLAUCONITIC, FOSSILIFEROUS.
COOK MTN.	LIMESTONE: WHITE, BIOCLASTIC CALCARENITE, CHALKY, GLAUCONITIC, FOSSILIFEROUS.
KOSCIUSKO (SPARTA)	CLAY: LIGHT OLIVE GRAY, DARK YELLOWISH BROWN, FOSSILIFEROUS, GLAUCONITIC, PYRITIC. SAND: CLEAR, FINE AND VERY FINE GRAINED, LOCALLY MEDIUM AND COARSE GRAINED, ANGULAR TO SUB-ANGULAR, OCCURS MAINLY IN THE LOWER 100 FEET. MUDSTONE: PALE GREEN, PALE GRAY, PALE BROWN, SILTY, GLAUCONITIC, LOCALLY FOSSILIFEROUS. LIMESTONE: WHITE, LIGHT GRAY, CALCARENITE AND CALCILUTITE MINOR DOLOMITE: BROWN, CRYSTALLINE AND SUCROSIC GLAUCONITE
ZILPHA	CLAY: DARK YELLOWISH BROWN AND LIGHT OLIVE GRAY, WITH YELLOWISH GRAY STREAKS, CALCAREOUS, WITH ABUNDANT FECAL GLAUCONITE, FORAMINIFERA, AND TRACES OF PYRITE, LIGNITE, CHERT, AND SAND
*6	LIMESTONE: WHITE AND LIGHT GRAY, CALCARENITE. SHALE: PALE GREENISH GRAY, SILTY, CALCAREOUS
TALLAHATTA	CLAY: DARK YELLOWISH BROWN, LIGHT OLIVE-GRAY, AND YELLOWISH GRAY, GLAUCONITIC. LIMESTONE: WHITE, PALE GRAYISH GREEN AND PALE GRAY, ARGILLACEOUS, SANDY, GLAUCONITIC, FOSSILIFEROUS SHALE: PALE GREEN, PALE BROWN, AND PALE GRAY, CALCAREOUS, SILTY, FOSSILIFEROUS, GLAUCONITIC. SANDSTONE: WHITE TO LIGHT GRAY, VERY FINE GRAINED, GLAUCONITIC, CALCAREOUS, GRADING INTO SANDY LIMESTONE, ABUNDANT FORAMINIFERA, AND FECAL GLAUCONITE.
	CLAY: LIGHT OLIVE-GRAY, DARK YELLOWISH BROWN, SILTY, GLAUCONITIC. SAND (AND SANDSTONE): CLEAR, DARK GREEN, AND LIGHT OLIVE GRAY, VERY FINE TO MEDIUM GRAINED, CALCAREOUS, VERY GLAUCONITIC. SHALE: PALE GREEN AND GRAY, SILTY, CALCAREOUS.

ELEVATION (FT.): GL 445.02 KB 456.32 TOTAL DEPTH (FT.) 3500

DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED

LOCATION SW/NE, SEC. 4, T5N, R17W, PERRY CO., MISSISSIPPI

HYDROLOGIC DATA:
1. TOTAL DISSOLVED SOLIDS: 11,590 MG/L
2. MAXIMUM TEMPERATURE: 93.8°F (DURING DRILLING)
3. ELEVATION, BASE OF FRESH WATER: -1055 FT MSL

PREPARED J.D.G. DATE 12/22/80
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED GHF DATE 12/22/80

T-1602B-0

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX A-1
DEEP BORING DATA SUMMARY
DOE ANDERSON MH-6A

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TABLE NO. A-1.6
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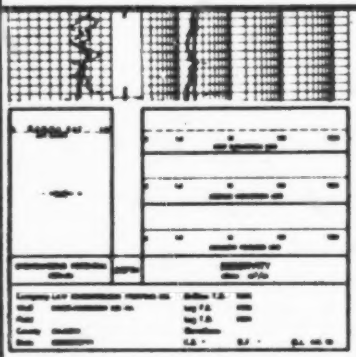
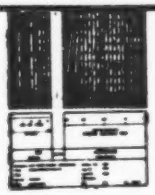
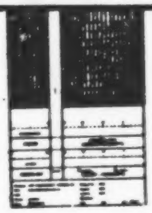
BEST DOCUMENT AVAILABLE

FORMATION	LITHOLOGY	LITHOLOGIC SYMBOLS	CORED INTERVAL	SIDEWALL CORES	SCREENED INTERVAL	ELEVATION X 100 (FEET)	DEPTH X 100 (FEET)	DUAL INDUCTION FOCUSED LOG	BOREHOLE COMPENSATED ACOUSTILOG	COMPENSATED DENSITY COMPENSATED NEUTRON LOG	DIFFERENTIAL TEMPERATURE LOG	ELEVATION X 100 (FEET)
	SEE PRECEEDING PAGE	▨		→		-30	35 TD					-30
		TD										

ELEVATION (FT.) GL 445.02 KB 456.32 TOTAL DEPTH (FT.) 3500
DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED
LOCATION SW/NE SEC. 4, T5N, R17W, PERRY CO., MISSISSIPPI

PREPARED J.D.G. DATE 12/22/80
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED GHF DATE 12/22/80
T-1602C-0

NATIONAL WASTE TERMINAL
STORAGE PROGRAM
GEOLOGIC EVALUATION GULF
COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX A-1
DEEP BORING DATA SUMMARY
DOE ANDERSON MH-6A
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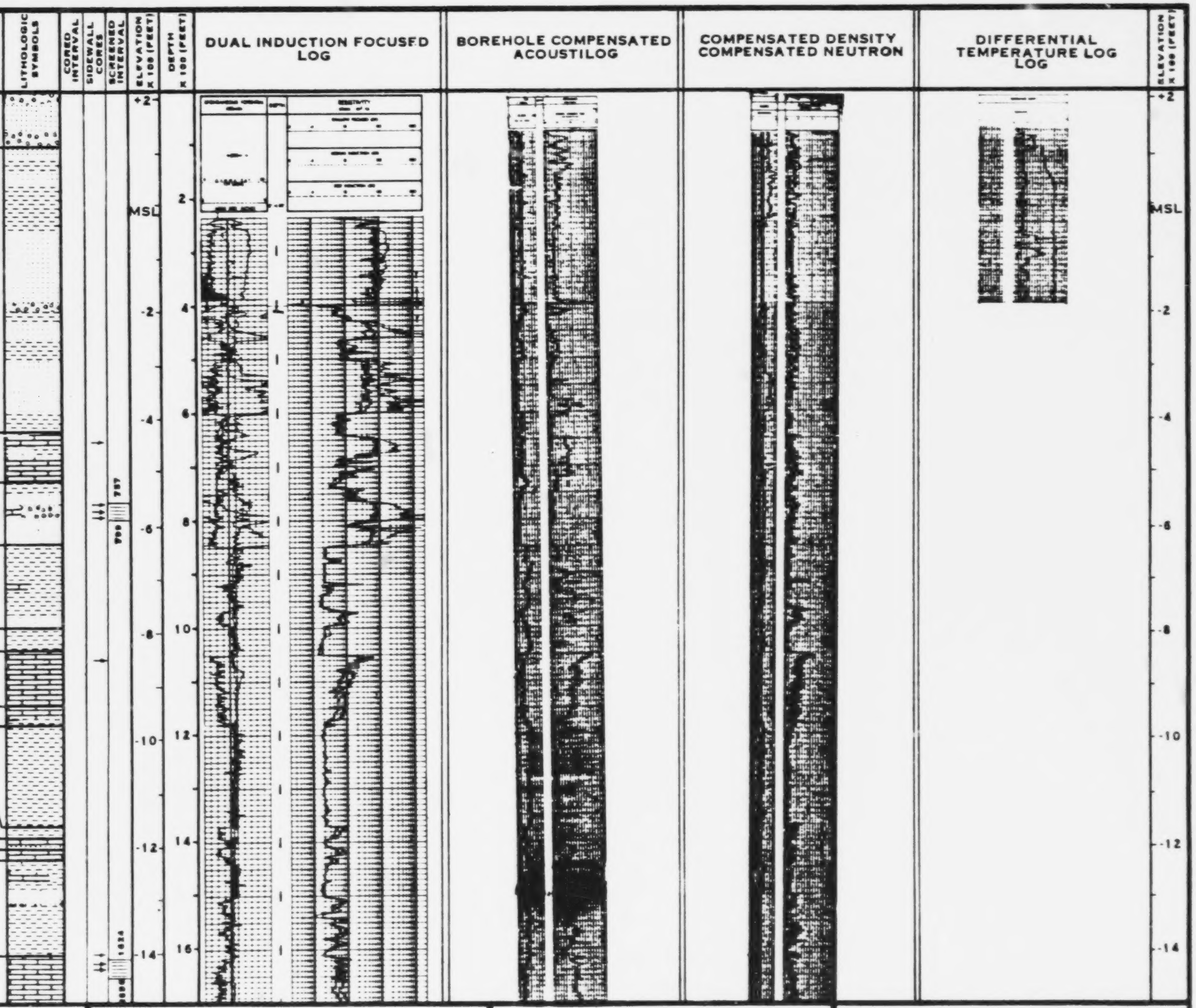
PAGE 3 OF 3

BEST DOCUMENT AVAILABLE

GROUP	FORMATION	LITHOLOGY
	HATTIESBURG AND CATAHOULA	SAND: WHITE, CLEAR, PALE ORANGE, YELLOW AND PINK, FINE TO VERY COARSE GRAINED, ANGULAR TO WELL ROUNDED GRAVEL: VARICOLORED, 2.0 TO 15 MM. IN DIAMETER, PREDOMINANTLY QUARTZ, CHERT AND (RARE) LIMESTONE.
		SAND: CLEAR TO WHITE, VERY FINE TO VERY COARSE GRAINED. WELL ROUNDED QUARTZ AND CHERT PEBBLES FROM 2 TO 10 MM. IN DIAMETER OCCUR BETWEEN 380 - 480 AND 520 - 600 FEET. CLAY: BUFF, GRAY, BROWN, PINK, AND MOTTLED GREEN, LOCALLY CALCAREOUS. MUDSTONE: WHITE, GRAY, OR VARICOLORED, SILTY TO SANDY, LOCALLY CALCAREOUS.
		HETEROSTEGINA ZONE: LIMESTONE: WHITE TO LIGHT GRAY, BIOCLASTIC CALCARENITE. SAND: CLEAR WHITE, VERY FINE TO COARSE GRAINED, ANGULAR TO WELL ROUNDED QUARTZ. CLAY: LIGHT GREEN, LIGHT GRAY, TAN, BROWN, AND BUFF, CALCAREOUS.
		CATAHOULA FORMATION: SAND: CLEAR WHITE, VERY FINE TO VERY COARSE GRAINED, ANGULAR TO SUB-ROUNDED. CLAY: LIGHT GREEN, GRAY AND BROWN. LIMESTONE: WHITE, CHALKY, SLIGHTLY GLAUCONITIC. FOSSILIFEROUS GRAVEL: VARICOLORED, 2 - 10 MM. OCCURS BETWEEN 770 - 830 FEET.
VICKSBURG	CHICKASAWHAY	CLAY: BROWN, GREEN, GRAY, ORANGE, AND MOTTLED GRAY. SAND: CLEAR TO LIGHT GRAY, FINE AND VERY FINE GRAINED, FOSSILIFEROUS, GLAUCONITIC. LIMESTONE: WHITE, BIOCLASTIC CALCARENITE, SANDY, FOSSILIFEROUS, GLAUCONITIC
	*1	CLAY: GRAY AND TAN, CALCAREOUS, GLAUCONITIC, FOSSILIFEROUS.
		LIMESTONE: WHITE BIOCLASTIC CALCARENITE, FOSSILIFEROUS, WITH GLAUCONITE AND PYRITE
	*2	LIMESTONE: WHITE BIOCLASTIC CALCARENITE, FOSSILIFEROUS, GLAUCONITIC CLAY: BUFF, CALCAREOUS, GLAUCONITIC.
JACKSON	YAZOO	CLAY: TAN, LIGHT GREEN, LIGHT GRAY, AND BROWN, FOSSILIFEROUS, GLAUCONITIC, PYRITIC. PACHUTA MARL MEMBER: CLAY: BUFF, GRAY, AND TAN-BROWN, CALCAREOUS, FOSSILIFEROUS, AND GLAUCONTIC LIMESTONE: WHITE BIOCLASTIC CALCARENITE. SAND: CLEAR, VERY FINE TO MEDIUM GRAINED, FOSSILIFEROUS. GLAUCONITIC
	*3 *4	LIMESTONE: WHITE BIOCLASTIC CALCARENITE. FOSSILIFEROUS. GLAUCONITIC.
CLAIBORNE	COCKFIELD	CLAY: BROWN, TAN, MOTTLED GRAY, AND GREENISH BROWN, CALCAREOUS, GLAUCONITIC, FOSSILIFEROUS, AND LOCALLY PYRITIC SAND: CLEAR AND LIGHT GREEN, MEDIUM TO COARSE GRAINED, AND BROWN, VERY FINE TO MEDIUM GRAINED, ANGULAR. LIMESTONE: WHITE, LIGHT GREEN AND LIGHT BROWN, SILTY, GLAUCONITIC, FOSSILIFEROUS. MUDSTONE: WHITE, LIGHT GREEN, AND LIGHT BROWN, SILTY GLAUCONITIC, AND FOSSILIFEROUS.
	COOK MTN.	LIMESTONE, WHITE BIOCLASTIC CALCARENITE. GLAUCONITIC. FOSSILIFEROUS.



ELEVATION (FT.): GL 210.4 KB 220.75 TOTAL DEPTH (FT.) 2049.92

DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED

LOCATION: SW/NW, SEC. 9, T5N, R13W, FORREST CO., MISSISSIPPI

NOTE: *1 BUCATUNNA FORMATION
*2 RED BLUFF FORMATION
*3 NORTH TWISTWOOD CREEK CLAY MEMBER
*4 MOODYS BRANCH FORMATION
*5 WINONA FORMATION

PREPARED	J.D.G.	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GHF	DATE	12/22/80

T-1603A-0

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

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JOB NO MV9700
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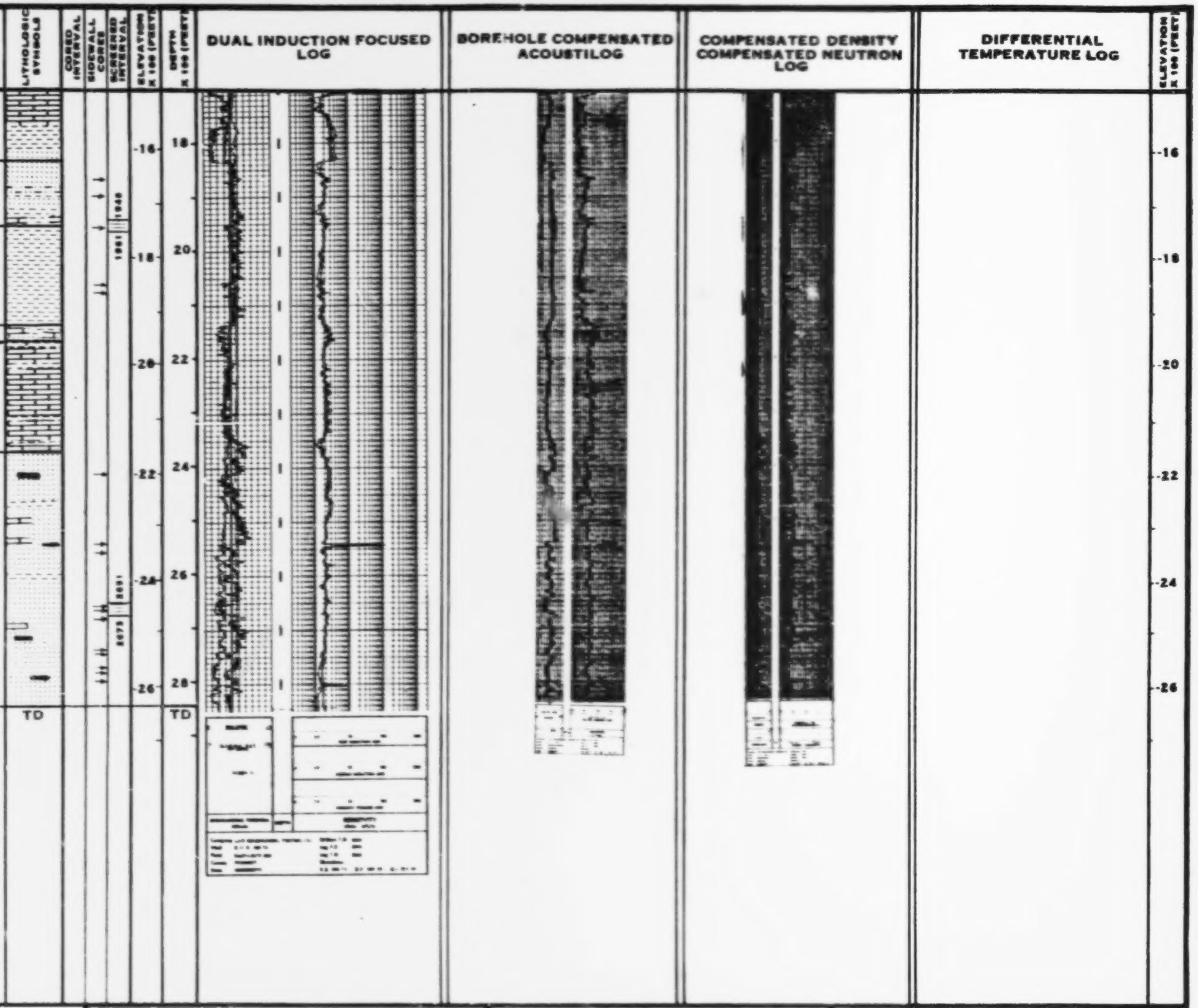
[redacted]

FORMATION	LITHOLOGY
CLAIBORNE — COOK MTN.	CLAY: TAN AND MOTTLED, CALCAREOUS, GLAUCONITIC, FOSSILIFEROUS. SAND: CLEAR, FINE TO COARSE GRAINED, ANGULAR TO SUB-ROUNDED, FOSSILIFEROUS.
KOSCIUSKO	SAND: CLEAR, VERY FINE TO VERY COARSE GRAINED, ANGULAR TO SUB-ROUNDED. CLAY: LIGHT BROWN TO DARK BROWN, CALCAREOUS, FOSSILIFEROUS. SILTSTONE: VERY LIGHT BROWN, ARGILLACEOUS, SANDY, CARBONACEOUS, MICACEOUS. DOLOMITE: BROWN, CRYSTALLINE, GLAUCONITIC. LIMESTONE: WHITE BIOCLASTIC CALCARENITE, GLAUCORITIC, FOSSILIFEROUS. MUDSTONE: VARICOLORED, SANDY, MICACEOUS.
ZILPHA	CLAY: BROWN AND DARK BROWN, MOTTLED, CALCAREOUS, SILTY, GLAUCONITIC, FOSSILIFEROUS. CONTAINS TRACES OF LIMESTONE, DOLOMITE, SAND, MUDSTONE, AND PYRITE.
*S	CLAY: BROWN AND LIGHT BROWN, CALCAREOUS, AND FOSSILIFEROUS. LIMESTONE: WHITE CALCARENITE AND MICROCRYSTALLINE, FOSSILIFEROUS, GLAUCONITE. SAND: CLEAR TO BROWN, FINE TO COARSE GRAINED
TALLAHATTA	LIMESTONE: WHITE TO LIGHT GRAY, BIOCLASTIC CALCARENITE.
WILCOX	CLAY: DARK BROWN, GREEN-BROWN, AND GRAY-BROWN, SILTY, FOSSILIFEROUS, GLAUCONITIC. SAND: (AND SANDSTONE) CLEAR, TAN, GREEN, AND LIGHT OLIVE GRAY VERY FINE TO MEDIUM GRAINED, SILTY, CARBONACEOUS, MICACEOUS. LIMESTONE: LIGHT GRAY, ARGILLACEOUS, CHALKY, AND WHITE, SILTY TO SANDY, BIOCLASTIC CALCARENITE. MUDSTONE: LIGHT BROWN, LIGHT GREEN, AND VARICOLORED, SILTY, MICACEOUS, GLAUCONITIC, FOSSILIFEROUS. LIGNITE: BLACK LAYERED FUSINITE, MAINLY BETWEEN 2700 AND 2790.



ELEVATION (FT.) GL 210.4 1 KB 220.75 TOTAL DEPTH (FT.) 2049.92
DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED
LOCATION: SW/NW SEC. 9, T5N, R13W, FORREST CO., MISSISSIPPI
HYDROLOGIC DATA:
1. TOTAL DISSOLVED SOLIDS: N/A
2. MAXIMUM TEMPERATURE: 98°F (DURING DRILLING)
3. ELEVATION, BASE OF FRESH WATER: -940 FT MSL

PREPARED J.D.G. DATE 12/22/80
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED GMF DATE 12/22/80
T-1603B-0

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
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BEST DOCUMENT ~~AVAILABLE~~

FORMATION | **LITHOLOGY**

HATTIESBURG - CATAHOULA

CLAY: TAN, YELLOWISH GRAY AND LIGHT OLIVE-GRAY.

SAND: CLEAR, WHITE, AND PINK, VERY FINE- TO VERY COARSE GRAINED QUARTZ AND CHERT.

GRAVEL: WELL ROUNDED QUARTZ AND CHERT PEBBLES 2 TO 6 MM. IN DIAMETER PREDOMINANTLY BETWEEN 225 AND 270 FEET

SILTSTONE: TAN, YELLOWISH GRAY, AND VARICOLORED, ARGILLACEOUS.

MUDSTONE: PALE, VARICOLORED, SILTY.

LIMESTONE: WHITE, CHALKY, A FEW THIN BEDS BETWEEN 60 AND 110 FEET.

HETEROSTEGINA ZONE:

LIMESTONE: WHITE TO GRAY, BIOCLASTIC, CALCARENITIC AND CHALKY, FOSSILIFEROUS

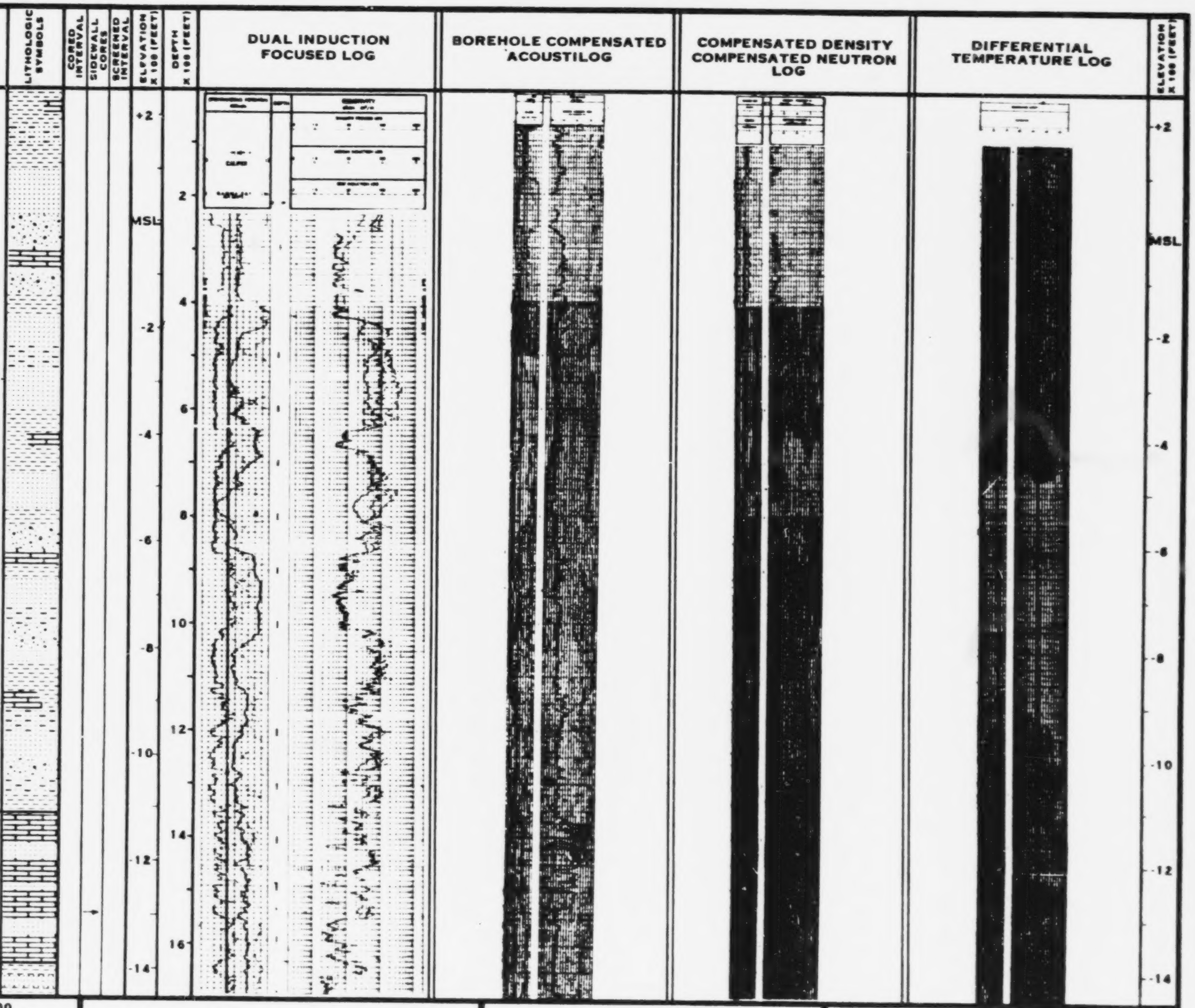
SAND: CLEAR, VERY FINE TO VERY COARSE GRAINED, ANGULAR TO WELL ROUNDED

LOWER CATAHOULA:

CLAY: LIGHT OLIVE-GRAY

SAND: CLEAR, SMOKY, AND PINK, VERY FINE TO COARSE GRAINED

SHALE: LIGHT OLIVE-GRAY AND YELLOWISH GRAY, SLIGHTLY CALCAREOUS



ELEVATION (FT.): GL 244.30 KB 254.30 TOTAL DEPTH (FT.) 3700
DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED
LOCATION: EAST 1/2 OF NE 1/4, SEC. 10, T2N, R17W MARION CO., MISSISSIPPI
HYDROLOGIC DATA:
1. TOTAL DISSOLVED SOLIDS: 40,400 MG/L
2. MAXIMUM TEMPERATURE: 102°F (DURING DRILLING)
3. ELEVATION, BASE OF FRESH WATER: -1576 FT MSL

PREPARED	JDG	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GHF	DATE	12/22/80

T-1604A-0

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX A-1
DEEP BORING DATA SUMMARY
DOE MASONITE MH-8A
JOB NO. MV9700
TABLE NO. A-1.8
PAGE 1 OF 3

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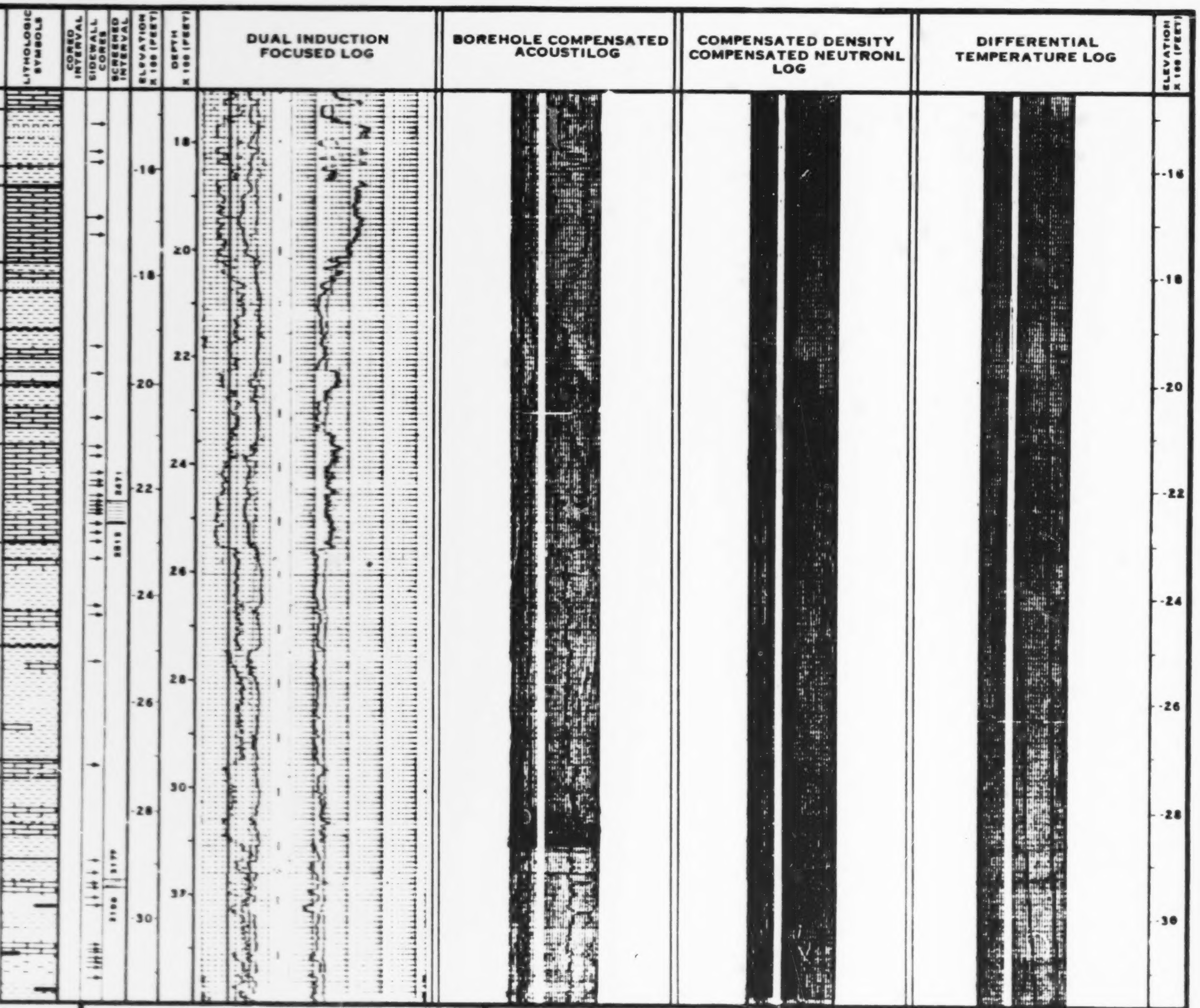
BEST DOCUMENT AVAILABLE

GROUP	FORMATION	LITHOLOGY
	*1	LIMESTONE: WHITE, CHALKY, SANDY.
	CHICKASAWHAY	CLAY: LIGHT OLIVE-GRAY, MOTTLED BROWN AND BLUE-GRAY. SAND: CLEAR, WHITE AND GRAY, VERY FINE TO VERY COARSE GRAINED, ANGULAR TO SUBANGULAR. SANDSTONE: WHITE TO BUFF, FINE TO COARSE GRAINED, CALCAREOUS.
VICKSBURG	*2	CLAY: LIGHT OLIVE-GRAY WITH MINOR SAND, SANDSTONE, AND LIMESTONE
		LIMESTONE: WHITE TO GRAY, CHALKY, FOSSILIFEROUS
		CLAY: LIGHT OLIVE-GRAY, MOTTLED BROWN. LIMESTONE: WHITE TO GRAY, CHALKY, WITH ABUNDANT PYRITE, GLAUCONITE, AND FORAMINIFERA
	*3	SAND: CLEAR TO GRAY, VERY FINE AND COARSE GRAINED.
JACKSON	YAZOO	CLAY: YELLOWISH GRAY AND MOTTLED OLIVE GRAY, FOSSILIFEROUS.
	*4	CLAY: YELLOWISH GRAY, CALCAREOUS, FOSSILIFEROUS, GLAUCONITIC LIMESTONE: WHITE TO GRAY, FOSSILIFEROUS.
		NORTH TWISTWOOD CREEK CLAY MEMBER
	*5	CLAY: LIGHT OLIVE-GRAY, GLAUCONITIC, FOSSILIFEROUS. MUDSTONE: PALE GREENISH BROWN, SILTY, FOSSILIFEROUS, GLAUCONITIC.
CLAIBORNE	COCKFIELD	LIMESTONE: WHITE, CALCARENITIC, GLAUCONITIC, CHALKY, FOSSILIFEROUS SAND: CLEAR, FINE TO COARSE GRAINED, GLAUCONITIC, FOSSILIFEROUS
	COOK MOUNTAIN	CLAY: OLIVE GRAY AND LIGHT OLIVE-GRAY, CALCAREOUS. SHALE: (AND MUDSTONE) PALE GREEN TO GRAYISH BROWN, GLAUCONITIC, CALCAREOUS, SILTY, FOSSILIFEROUS. LIMESTONE: GREENISH BROWN, OLIVE GRAY, WHITE AND GREENISH YELLOW, CHALKY, ARGILLACEOUS, SANDY, GLAUCONITIC, FOSSILIFEROUS. LIMESTONE: WHITE TO PALE GREEN, BIOCLASTIC, CALCARENITIC, GLAUCONITIC, CHALKY. MINOR INTERBEDDED CLAY, OLIVE-GRAY, WAXY, CALCAREOUS.
	KOSCIUSKO (SPARTA)	CLAY: OLIVE-GRAY, YELLOWISH BROWN, AND MOTTLED BROWN, GLAUCONITIC FOSSILIFEROUS LIMESTONE: BUFF TO WHITE, CALCARENITIC, ARGILLACEOUS. SHALE (MUDSTONE): LIGHT BROWN, GRAYISH BROWN, AND GREENISH BROWN, SILTY, MICACEOUS. MINOR AMOUNTS OF SAND IN LOWER PART, LIGHT BROWN, VERY FINE GRAINED, SILTY, ARGILLACEOUS.
	ZILPHA	CLAY: DARK YELLOWISH BROWN, MOTTLED BROWN, GRAY AND WHITE, CALCAREOUS, FOSSILIFEROUS, GLAUCONITIC
	*6	LIMESTONE: MOTTLED GRAY, CHALKY, GLAUCONITIC, ARGILLACEOUS, FOSSILIFEROUS
	TALLAHATTA	CLAY: LIGHT OLIVE GRAY TO DARK YELLOWISH BROWN, GLAUCONITIC, FOSSILIFEROUS SHALE (AND MUDSTONE): GREENISH GRAY, YELLOWISH GRAY, AND BROWN, CALCAREOUS, SILTY, GLAUCONITIC, FOSSILIFEROUS. LIMESTONE: PALE GREENISH GRAY AND GRAY-BROWN, CRYSTALLINE AND CALCARENITIC.
WILCOX		CLAY: LIGHT OLIVE-GRAY, SILTY. LIMESTONE: PALE GREENISH GRAY AND GRAY-BROWN, CRYSTALLINE AND CALCARENITIC, GLAUCONITIC, FOSSILIFEROUS SILTSTONE: GRAY, BROWN, AND GREEN, ARGILLACEOUS, SANDY, MICACEOUS SAND (AND SANDSTONE): CLEAR, GREEN, BROWN, WHITE AND PINK, VERY FINE TO VERY COARSE GRAINED, ANGULAR TO WELL ROUNDED, ARGILLACEOUS, CALCAREOUS, GLAUCONITIC LIGNITE: BROWN TO BLACK, FIBROUS, COMMON THROUGHOUT EXCEPT IN THE UPPER 100 FEET



ELEVATION (FT.) GL 244.30 KB 254.30 TOTAL DEPTH (FT.) 3700
DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED
LOCATION EAST 1/2 OF NE 1/4, SEC 10, T2N, R17W, MARION CO., MISSISSIPPI

NOTE:
- *1 CATAHOULA FORMATION
- *2 BUCATUNNA FORMATION
- *3 RED BLUFF FORMATION
- *4 PACHUTA MARL MEMBER
- *5 MOODYS BRANCH FORMATION
- *6 WINONA FORMATION

PREPARED JDG DATE 12/22/80
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED GHF DATE 12/22/80

T-1604B-0

NATIONAL WASTE TERMINAL
STORAGE PROGRAM
GEOLOGIC EVALUATION GULF
COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
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DEEP BORING DATA SUMMARY
DOE MASONITE MH-8A

JOB NO. MV9700
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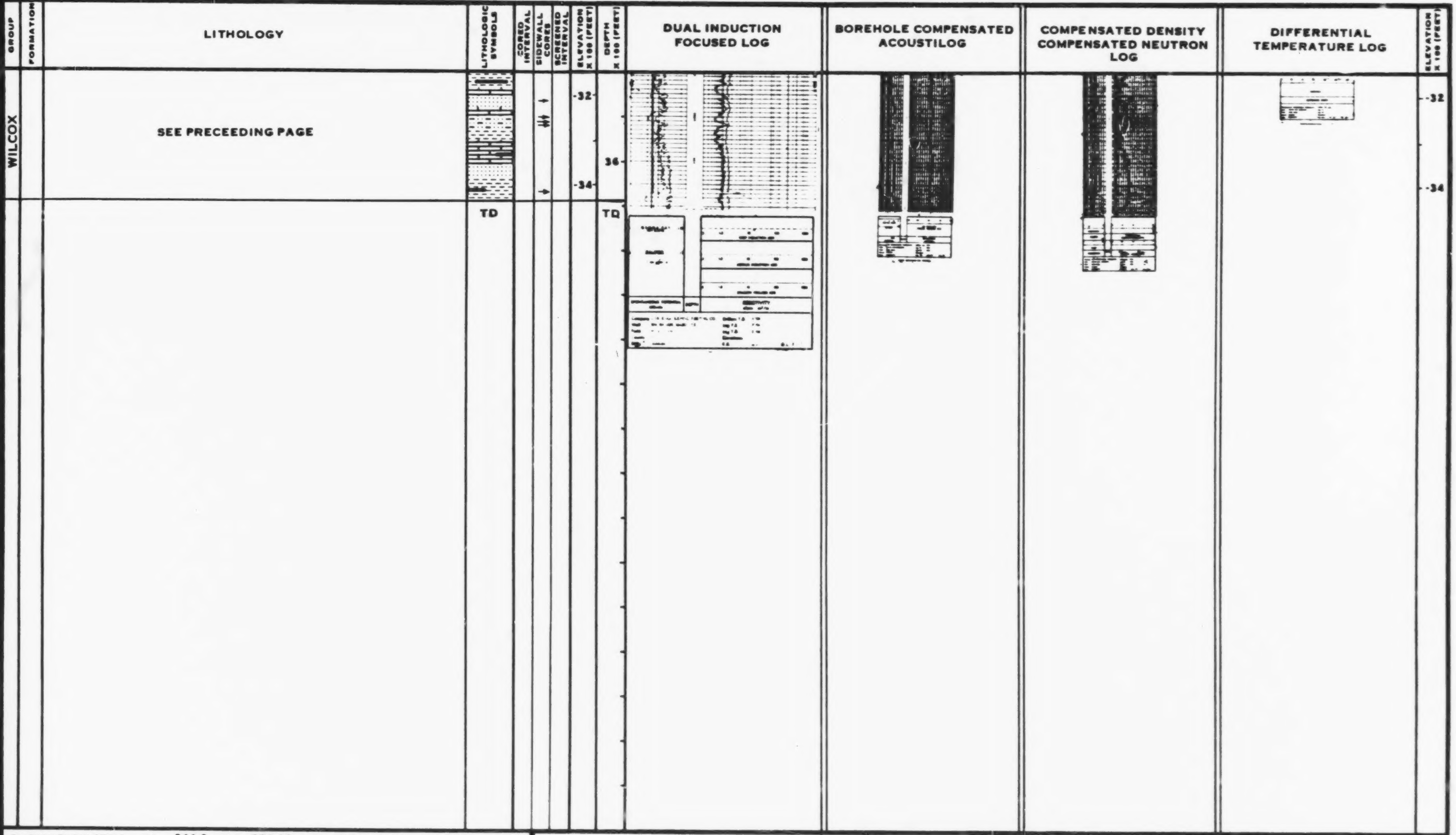
BEST DOCUMENT AVAILABLE



ELEVATION (FT.): GL 244.2 KB 254.30 TOTAL DEPTH (FT.) 3700
DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED
LOCATION: EAST 1/2 OF NE 1/4,SEC. 10, T2N, R17W MARION CO., MISSISSIPPI

PREPARED J.D.G. DATE 12/22/80
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED GHF DATE 12/22/80
T-1604C-0

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
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DEEP BORING DATA SUMMARY
DOE MASONITE MH-8A
JOB NO. MV9700
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LITHOLOGY

T CITRONELLE

CLEAR, LOCALLY YELLOW OR PINK, VERY COARSE TO FINE
AINED. QUARTZ PEBBLES 2 TO 4 MM IN DIAMETER OCCUR
TWEEN 60 AND 100 FT.

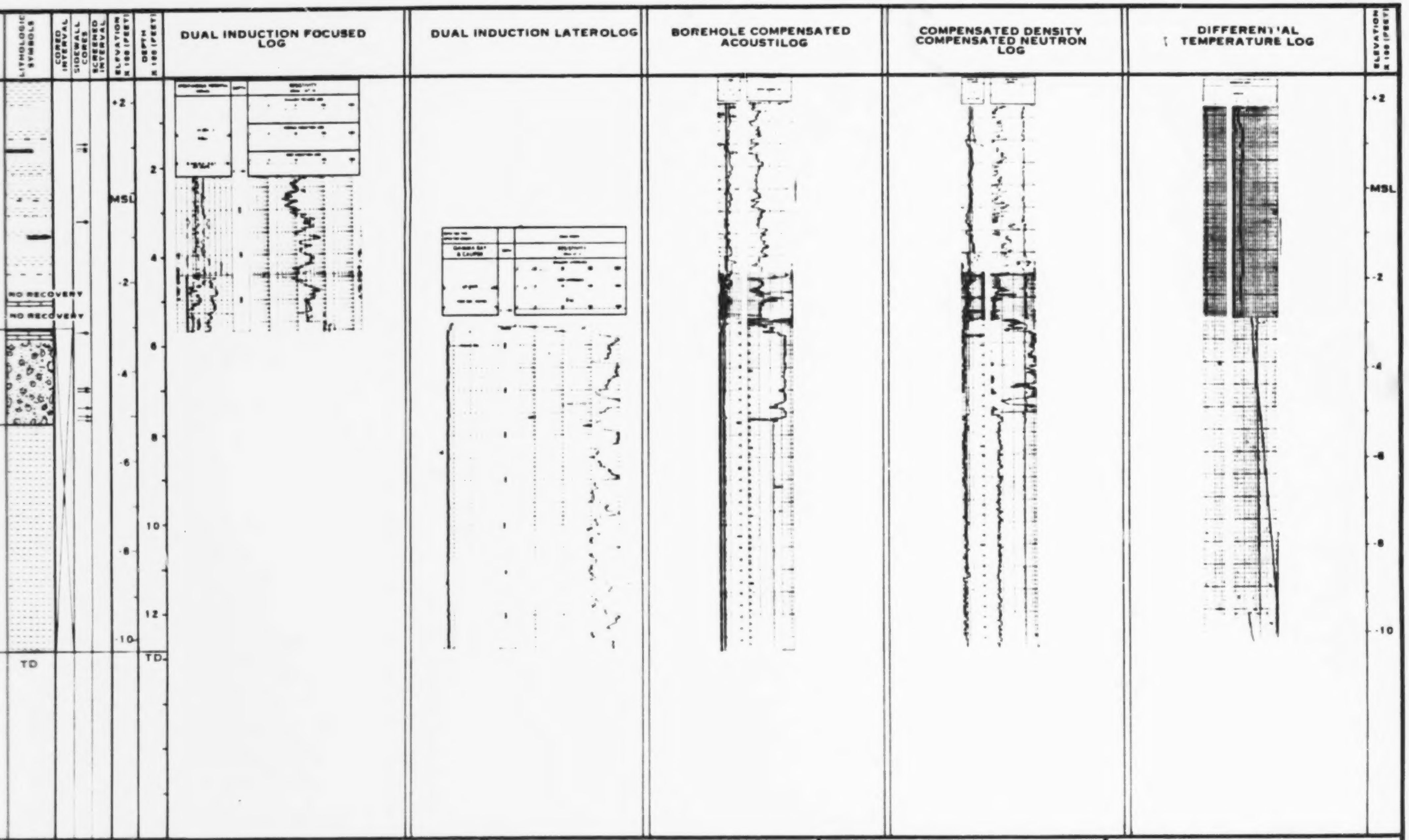
GRAY TO OLIVE-GRAY

ONE AND SILTSTONE: YELLOW-GRAY TO PALE GREEN, SLIGHTLY
LCAREOUS

ONE: YELLOW TO GRAY, VUGGY, ABUNDANT SPARITE

RITE: LIGHT GRAY, FINE TO COARSE CRYSTALLINE WITH GYPSUM
D MINOR CALCITE AND SULPHUR. GRADES INTO UNCONSOLIDATED
HYDRITE SAND AT BASE

: CLEAN, CRYSTALLINE, WITH DISSEMINATED ANHYDRITE GRAINS,
NDS AND CLASTS



T) GL 256.7 KB 267.48 TOTAL DEPTH (FT) 1275.43
NTS ARE FROM GROUND LEVEL EXCEPT AS NOTED
E/NW, SEC. 26, T5N, R10W, PERRY CO., MISSISSIPPI (RICHTON DOME)
DATA 1. TOTAL DISSOLVED SOLIDS 310,000 MG/L
2. MAXIMUM TEMPERATURE DURING PUMP TEST 88.2°F
3. ELEVATION, BASE OF FRESH WATER 884 FT MSL

PREPARED J D G DATE 12/28/80
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED GHF DATE 12/22/80
T-1605-0

NATIONAL WASTE TERMINAL
STORAGE PROGRAM
GEOLOGIC EVALUATION GULF
COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA, GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX A-1
DEEP BORING DATA SUMMARY
DOE MASONITE MRIG-9
JOB NO. MV9700
TABLE NO
PAGE 1 OF 1

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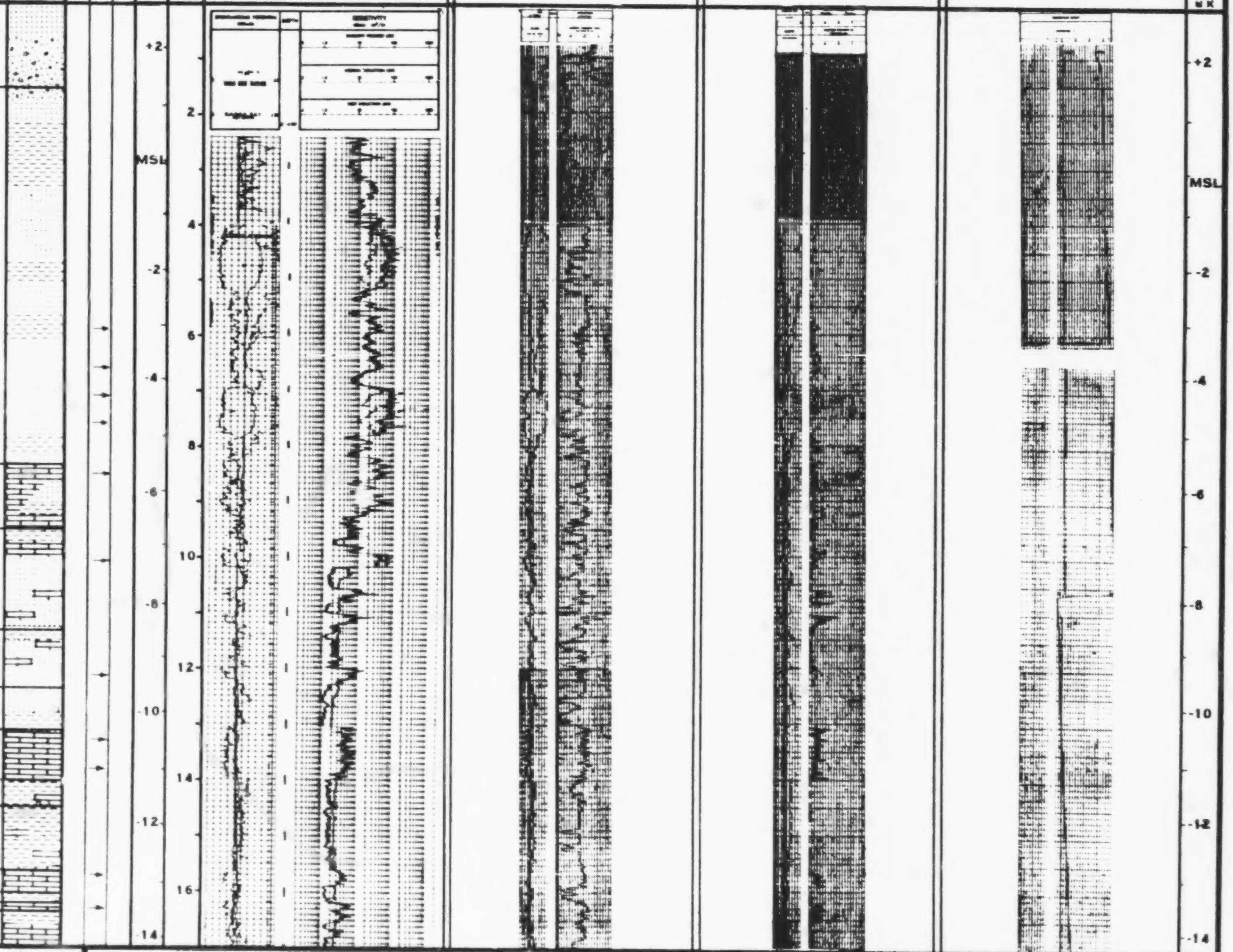
GROUP	FORMATION	LITHOLOGY
	CITRONELLE	SAND: CLEAR TO WHITE, COARSE TO FINE GRAINED, ANGULAR TO SUB-ROUNDED QUARTZ. GRAVEL: VARICOLORED, PRIMARILY QUARTZ, QUARTZITE, AND CHERT, 2 - 10 MM. IN DIAMETER. TRACES OF LIMESTONE GRAVEL THROUGHOUT FORMATION.
	HATTIESBURG - CATAHOULA	SAND: WHITE, LIGHT GRAY, PINK, COARSE TO VERY FINE GRAINED. CLAY: YELLOW-GRAY TO OLIVE-GRAY. PYRITE COMMON THROUGHOUT.
		HETEROSTEGINA ZONE: LIMESTONE: WHITE, CHALKY, SANDY, FOSSILIFEROUS, INTERBEDDED WITH SAND AND CLAY.
		LOWER CATAHOULA: CLAY: OLIVE-GRAY LIMESTONE: WHITE TO GRAY, CHALKY, SANDY SAND: CLEAR, MEDIUM TO FINE GRAINED, FOSSILIFEROUS
	*1	CLAY: OLIVE-GRAY LIMESTONE: WHITE TO GRAY, CRYSTALLINE, GRADING INTO CALCAREOUS SANDSTONE SAND: FINE GRAINED, UNCONSOLIDATED, FOSSILIFEROUS
VICKSBURG	*2	SAND: FINE TO MEDIUM GRAINED MUDSTONE: LIGHT GREEN TO BROWN
		LIMESTONE: WHITE, CRYSTALLINE, GLAUCONITIC AND FOSSILIFEROUS
	*3	CLAY: OLIVE-GRAY LIMESTONE: WHITE, CHALKY, WITH MINOR DOLOMITE
JACKSON	YAZOO	CLAY: LIGHT OLIVE-GRAY LIMESTONE: WHITE, SANDY, WITH ABUNDANT FOSSILS AND GLAUCONITE THROUGHOUT
	*4	LIMESTONE: WHITE AND BROWN, CHALKY, MICROCRYSTALLINE, FOSSILIFEROUS, PARTLY DOLOMITIC.
	*5	CLAY: LIGHT OLIVE-GRAY, WITH INTERBEDDED LIGHT GREEN CALCAREOUS SHALE.
		LIMESTONE: WHITE TO GRAY, MICROCRYSTALLINE, GLAUCONITIC, FOSSILIFEROUS
		CLAY: LIGHT OLIVE-GRAY
7	*8	SHALE: LIGHT GREEN TO LIGHT BROWN, SILTY, CALCAREOUS, GLAUCONITIC LIMESTONE: LIGHT BROWN, GREEN AND WHITE, SANDY, GLAUCONITIC, FOSSILIFEROUS

LITHOLOGIC SYMBOLS | CORED INTERVAL | SIDEWALL CORES | SCREENED INTERVAL | ELEVATION X 100 (FEET) | DEPTH X 100 (FEET)

DUAL INDUCTION FOCUSED LOG | BOREHOLE COMPENSATED ACOUSTILOG | COMPENSATED DENSITY COMPENSATED NEUTRON LOG | DIFFERENTIAL TEMPERATURE LOG | ELEVATION X 100 (FEET)



ELEVATION (FT.): GL 284.6 KB 290.6 TOTAL DEPTH (FT.) 2699.38
DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED
LOCATION: NE/NW, SEC. 12, T5N, R10W, PERRY CO., MISSISSIPPI

NOTES:
- *1 CHICKASAWHAY FORMATION
- *2 BUCATUNNA FORMATION
- *3 RED BLUFF FORMATION
- *4 PACHUTA MARL MEMBER
- *5 NORTH TWISTWOOD CREEK CLAY MEMBER
- *6 MOODYS BRANCH FORMATION
- *7 CLAIBORNE GROUP
- *8 COCKFIELD FORMATION
- *9 WINONA FORMATION

PREPARED J.D.G. DATE 12/22/80
REVISED ________ DATE ________
REVISED ________ DATE ________
APPROVED GHF DATE 12/22/80

T-1606A-0

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX A-1
DEEP BORING DATA SUMMARY
DOE - MASONITE MRIG-10
TABLE NO. A-1.10
JOB NO. MV9700
PAGE 1 OF 2

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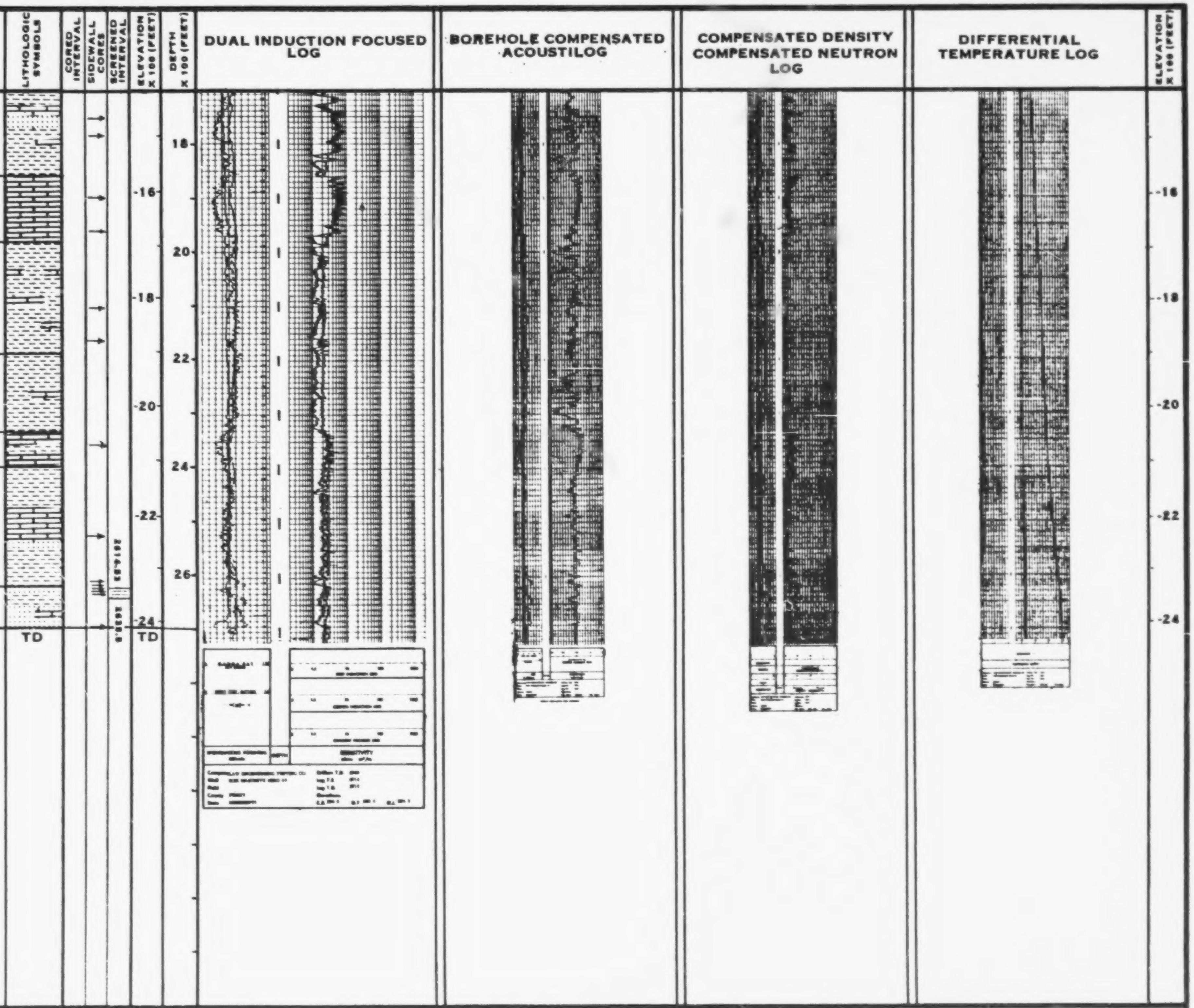
BEST DOCUMENT AVAILABLE

FORMATION	LITHOLOGY
COCKFIELD	SEE PRECEEDING PAGE
COOK MTN.	LIMESTONE: CRYSTALLINE, FOSSILIFEROUS.
KOSCIUSKO (SPARTA)	CLAY: LIGHT OLIVE-GRAY LIMESTONE: WHITE, GRAY AND BROWN CRYSTALLINE SANDY, CHALKY, FOSSILIFEROUS AND PYRITIC SHALE: LIGHT BROWN, AND LIGHT GRAY-GREEN, SILTY, CALCAREOUS.
ZILPHA	CLAY: LIGHT OLIVE-GRAY LIMESTONE: WHITE TO LIGHT BROWN, SANDY, GLAUCONITIC SHALE: GREENISH GRAY, SILTY, CALCAREOUS, FOSSILS COMMON THROUGHOUT.
*9	LIMESTONE: WHITE, YELLOW-GRAY, AND LIGHT BROWN, CHALKY, SANDY, ARGILLACEOUS, FOSSILIFEROUS SHALE: GRAY-GREEN, CALCAREOUS, SILTY
TALLAHATTA	CLAY: LIGHT OLIVE-GRAY LIMESTONE: WHITE, GRAY AND BROWN, SANDY, CHALKY, GLAUCONITIC, FOSSILIFEROUS SHALE: GRAY-GREEN AND BROWN, SILTY, CALCAREOUS, GLAUCONITIC AND FOSSILIFEROUS THROUGHOUT
	SAND: OLIVE-GRAY, FINE TO VERY COARSE GRAINED, ARGILLACEOUS, CALCAREOUS, GLAUCONITIC, FRIABLE TO CONSOLIDATED SHALE: LIGHT GREENISH GRAY TO BROWN, SILTY AND CALCAREOUS LIMESTONE: WHITE TO GRAY, SHALEY, SANDY, PYRITIC, FOSSILIFEROUS, GLAUCONITIC WITH MINOR LIGNITE



ELEVATION (FT.): GL 284.6 KB 290.6 TOTAL DEPTH (FT.) 2699.30

DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED

LOCATION: NE/NW, SEC. 12, T5N, R10W, PERRY CO., MISSISSIPPI

HYDROLOGIC DATA:
1. TOTAL DISSOLVED SOLIDS: 14,400 MG/L
2. MAXIMUM TEMPERATURE: 105.3°F (DURING DRILLING)
3. ELEVATION, BASE OF FRESH WATER: -768 FT MSL

PREPARED J.D.G. DATE 12/22/80
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED GHF DATE 12/22/80

T-1606B-0

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX A-1
DEEP BORING DATA SUMMARY
DOE - MASONITE MRIG-10

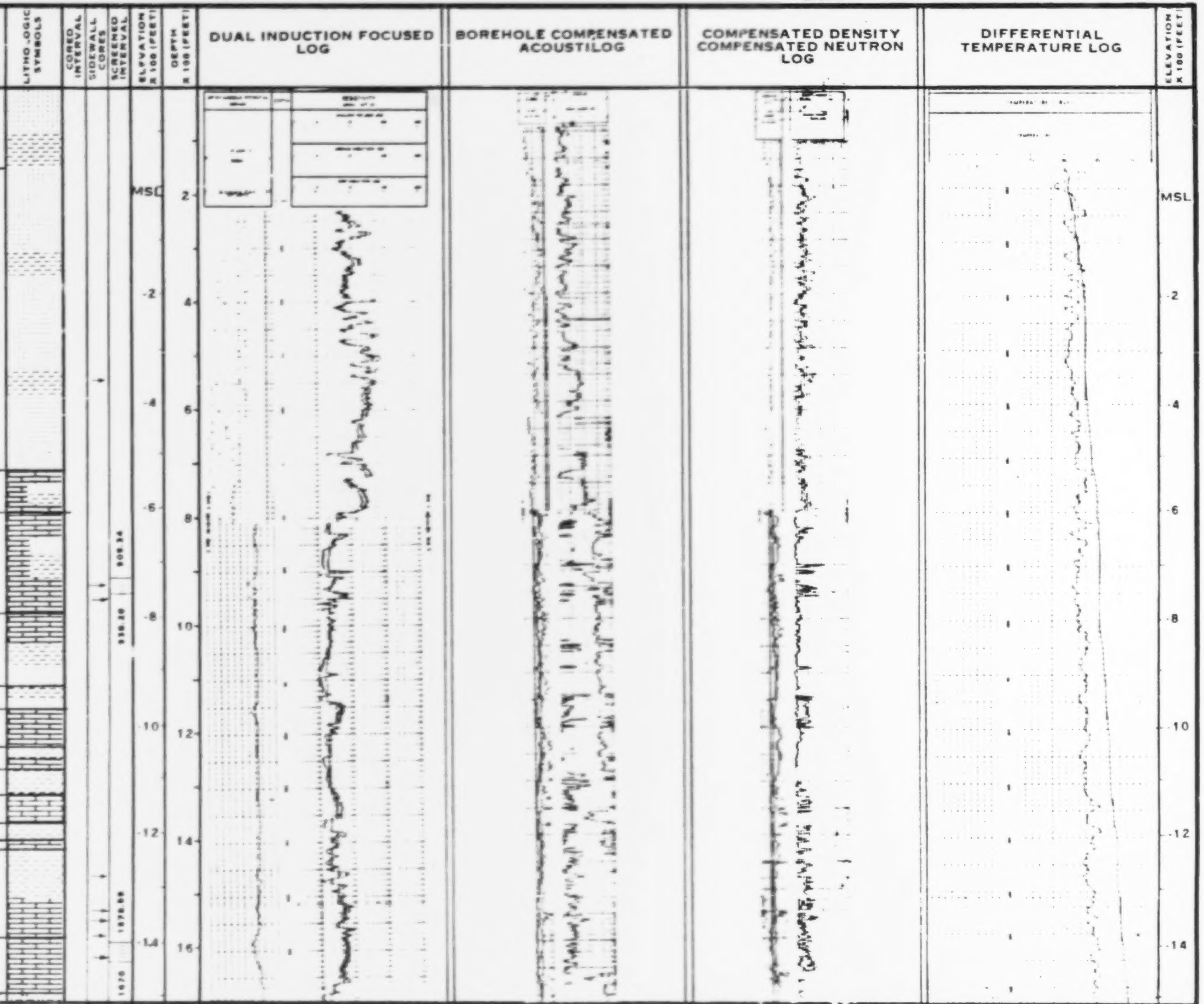
JOB NO. MV9700

TABLE NO. A-1.10
PAGE 2 OF 2

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

GROUP	FORMATION	LITHOLOGY
	CITRON-ELLE	SAND: CLEAR, WHITE AND ORANGE STAINED, VERY COARSE TO VERY FINE-GRAINED, ABUNDANT QUARTZ AND CHERT PEBBLES IN UPPER PORTION. CLAY: YELLOW-GRAY TO OLIVE-GRAY, PYRITE COMMON THROUGHOUT.
	HATTIESBURG - CATAHOULA	SAND: CLEAR, WHITE AND ORANGE STAINED, VERY COARSE TO VERY FINE-GRAINED, ABUNDANT QUARTZ AND CHERT PEBBLES IN UPPER PORTION. CLAY: YELLOW-GRAY TO OLIVE-GRAY, PYRITE COMMON THROUGHOUT.
		HETEROSTEGINA ZONE: LIMESTONE: WHITE TO LIGHT GRAY, BIOCLASTIC, FOSSILIFEROUS, INTERBEDDED WITH CLAY AND SAND
		LOWER CATAHOULA: LIMESTONE: WHITE TO LIGHT GRAY, BIOCLASTIC, SANDY CALCARENITE FOSSILIFEROUS WITH INTERBEDDED SAND AND CLAY
	CHICKA-SAWHAY	LIMESTONE: WHITE TO TAN, BIOCLASTIC CALCARENITE, FOSSILIFEROUS, INTERBEDDED WITH: CLAY: LIGHT OLIVE-GRAY SAND: CLEAR, MEDIUM GRAINED
VICKS-BURG	*1	CLAY: LIGHT OLIVE GRAY SAND: CLEAR, MEDIUM TO FINE GRAINED, FOSSILIFEROUS
	*2	LIMESTONE: WHITE TO GRAY, CHALKY, SANDY
	*3	CLAY: LIGHT OLIVE GRAY LIMESTONE: WHITE, CHALKY, FOSSILIFEROUS
JACKSON	YAZOO	CLAY: LIGHT OLIVE-GRAY AND YELLOWISH GRAY, MOTTLED, FOSSILIFEROUS, GLAUCONITIC.
		PACHUTA MARL MEMBER MARL: WHITE TO GRAY, CHALKY, FOSSILIFEROUS
		NORTH TWISTWOOD CREEK CLAY MEMBER CLAY: LIGHT OLIVE-GRAY, CALCAREOUS, FOSSILIFEROUS, GLAUCONITIC
	*4	
CLAIBORNE	COCKFIELD	LIMESTONE: WHITE, CHALKY, SANDY, AND BIOCLASTIC CALCARENITIC FOSSILIFEROUS GLAUCONITIC
		CLAY: YELLOWISH GRAY TO DARK YELLOWISH BROWN
		LIMESTONE: GREENISH GRAY, CHALKY, CALCARENITIC, FOSSILIFEROUS GLAUCONITIC
	COOK MTN.	LIMESTONE: WHITE, CHALKY, SANDY TO SILTY FOSSILIFEROUS
	*5	



ELEVATION (FT.) GL 180.4 KB 190.5 TOTAL DEPTH (FT.) 6041.15

DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED

LOCATION: SE/NE,SEC. 9, T4N, R10W, PERRY CO., MISSISSIPPI

NOTES:
*1 BUCATUNNA FORMATION
*2 VICKSBURG LIMESTONES
*3 RED BLUFF FORMATION
*4 MOODYS BRANCH FORMATION
*5 KOSCIUSKO (SPARTA) FORMATION
*6 WINONA FORMATION
*7 CLAYTON FORMATION

PREPARED	JDG	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GHF	DATE	12/22/8

T-1607A-0

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA, GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX A-1
DEEP BORING DATA SUMMARY
DOE SMITH MRIH-11A

JOB NO. MV9700

TABLE NO A-1.11
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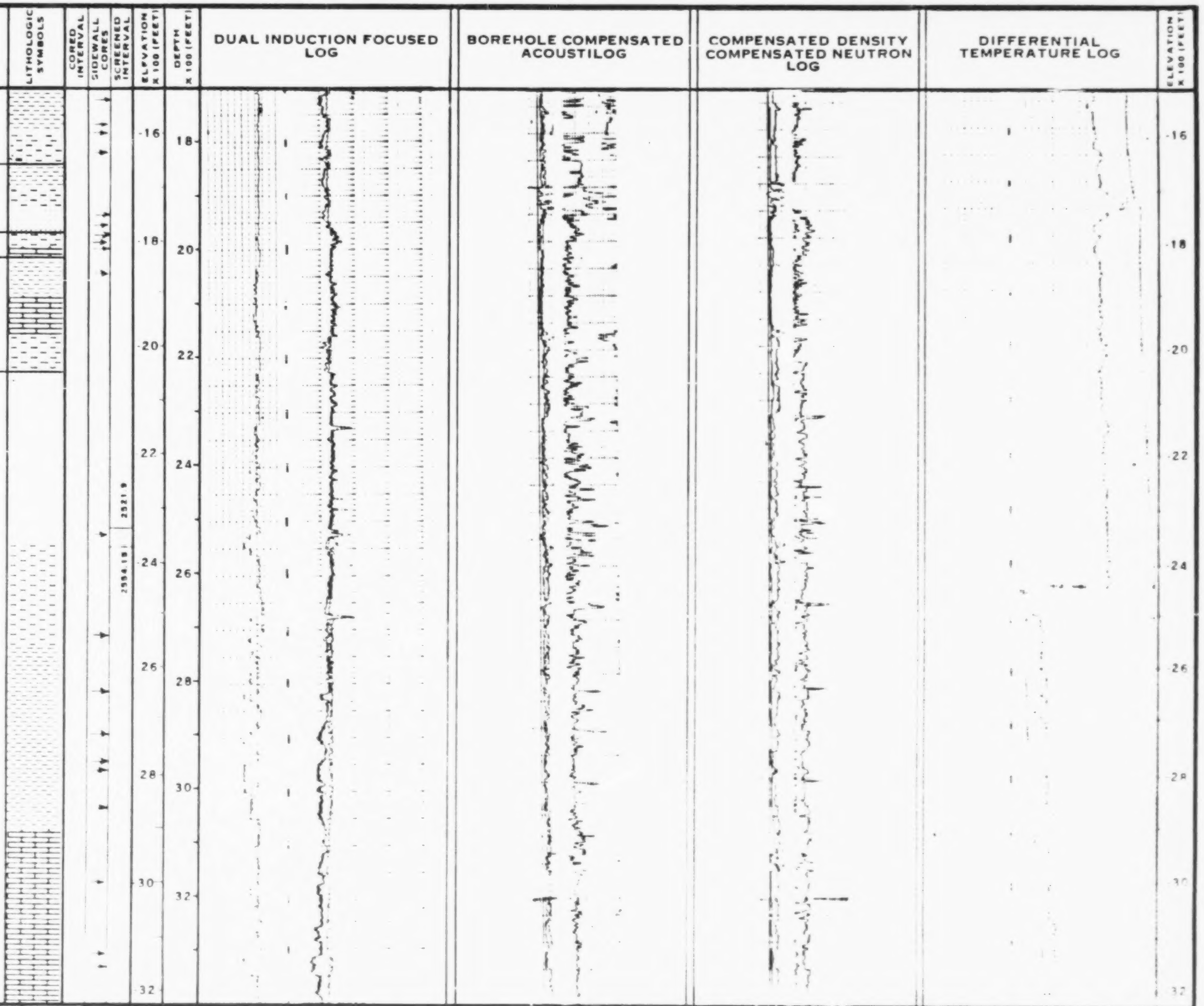
BEST DOCUMENT AVAILABLE

GROUP	FORMATION	LITHOLOGY
CLAIBORNE	KOSIUSKO (SPARTA)	CLAY: LIGHT OLIVE GRAY TO DARK YELLOWISH BROWN SHALE: GREENISH GRAY, SILTY, MICACEOUS. SILTSTONE: BROWN AND GREENISH-GRAY, ARGILLACEOUS, SLIGHTLY CALCAREOUS, GLAUCONITIC
	ZILPHA	CLAY: OLIVE GRAY AND DARK YELLOWISH BROWN, INTERBEDDED WITH SHALE: GRAY, CALCAREOUS SILTSTONE: BROWN, ARGILLACEOUS SAND: CLEAR, COARSE TO VERY FINE GRAINED, GLAUCONITIC AND FOSSILIFEROUS THROUGHOUT
	*6	SILTSTONE: BROWNISH GRAY TO GREEN, ARGILLACEOUS, GLAUCONITIC, AND FOSSILIFEROUS LIMESTONE: WHITE, SANDY CALCARENITIC, GLAUCONITIC FOSSILIFEROUS
	TALLAHATTA	CLAY: LIGHT OLIVE GRAY LIMESTONE: LIGHT GRAY, ARGILLACEOUS, SANDY, FOSSILIFEROUS, GLAUCONITIC SILTSTONE: LIGHT GRAY AND LIGHT BROWN, CALCAREOUS, ARGILLACEOUS FOSSILIFEROUS
WILCOX		SAND: WHITE TO GRAY, FINE AND VERY GRAINED SILTSTONE: GRAY, ARGILLACEOUS, MICACEOUS CLAY: GRAY TO OLIVE GRAY, SILTY, FOSSILIFEROUS LIMESTONE: WHITE, GRAY, PALE GREEN, SANDY, FOSSILIFEROUS, GLAUCONITIC GLAUCONITE, PYRITE, FOSSIL FRAGMENTS AND TRACES OF LIGNITE COMMON THROUGHOUT



ELEVATION (FT.) GL 180.4 KB 190.5 TOTAL DEPTH (FT.) 6041.15
DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED
LOCATION SE NE, SEC. 9, T4N, R10W, PERRY CO., MISSISSIPPI
HYDROLOGIC DATA
1. TOTAL DISSOLVED SOLIDS 107,000 MG/L
2. MAXIMUM TEMPERATURE 113.2°F (DURING DRILLING)
3. ELEVATION, BASE OF FRESH WATER -480 FT MSL

PREPARED	JDG	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GHF	DATE	12/22/80

T-1607B-0

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA, GEORGIA

MISSISSIPPI STUDY AREA
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DEEP BORING DATA SUMMARY
DOE SMITH MRIH-11A
JOB NO. MV9700
TABLE NO. A.1.1
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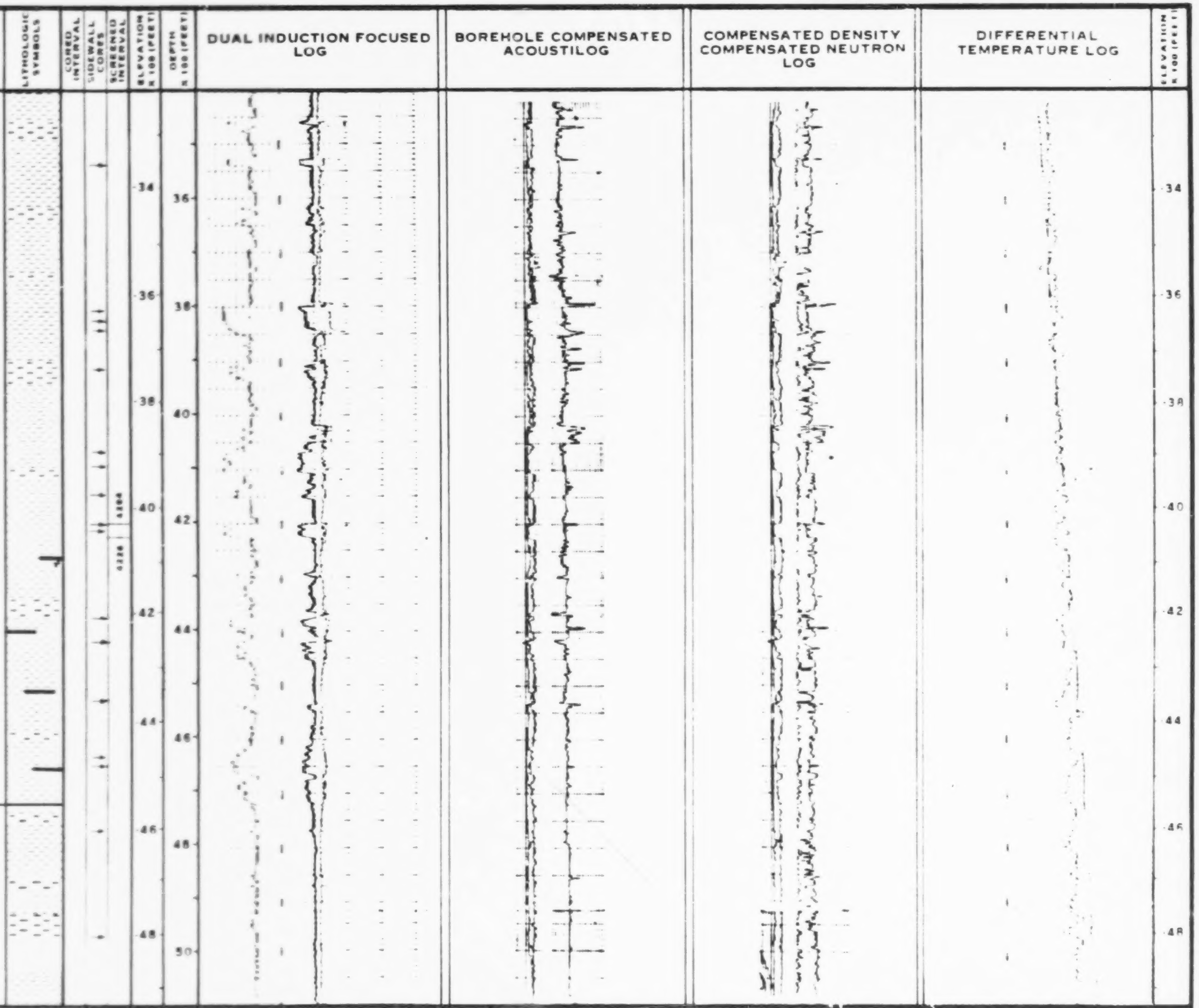
BEST DOCUMENT AVAILABLE

GROUP	FORMATION	LITHOLOGY
WILCOX		SAND WHITE TO GRAY FINE AND VERY GRAINED SILTSTONE GRAY ARGILLACEOUS MICACEOUS CLAY GRAY TO OLIVE-GRAY SILTY FOSSILIFEROUS LIMESTONE WHITE GRAY PALE GREEN SANDY FOSSILIFEROUS GLAUCONITIC GLAUCONITE PYRITE FOSSIL FRAGMENTS AND TRACES OF LIGNITE COMMON THROUGHOUT
MIDWAY		SEE NEXT PAGE



ELEVATION (FT.) GL 180.4 KB 190.5 TOTAL DEPTH (FT.) 6041.15
DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED
LOCATION SE,NE,SEC 9, T4N, R10W, PERRY CO., MISSISSIPPI

PREPARED JDG DATE 12/22/80
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED GHF DATE 12/29/80
T-1607C-0

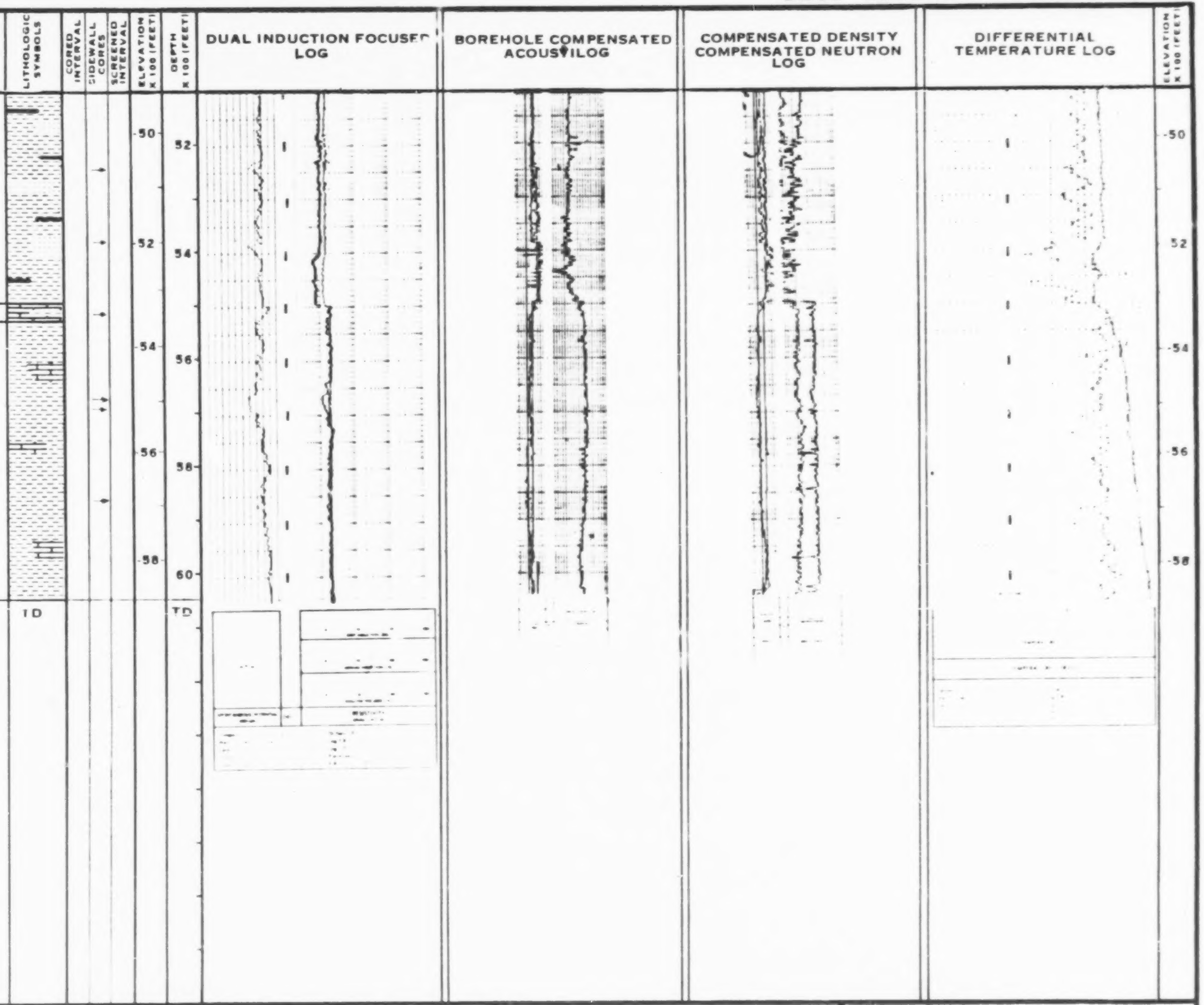
NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA, GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX A-1
DEEP BORING DATA SUMMARY
DOE SMITH MRIH-11A
JOB NO. MV9700
TABLE NO. A-1.11
PAGE 3 OF 4

[redacted]

BEST DOCUMENT AVAILABLE

GROUP	FORMATION	LITHOLOGY
MIDWAY		CLAY: OLIVE-GRAY, INTERBEDDED WITH: SAND: CLEAR, TO LIGHT GRAY, COARSE TO VERY FINE GRAINED, SILTY SHALE: GRAY, SILTY, POORLY FISSILE LIGNITE, PYRITE, GLAUCONITE COMMON THROUGHOUT
	*7	LIMESTONE: WHITE TO VERY LIGHT GRAY, CHALKY, SILTY, ARGILLACEOUS, FOSSILIFEROUS AND GLAUCONITIC. ABUNDANT OLIVE-GRAY CLAY AND GRAY SILTY SHALE.
SELMA		CLAY: OLIVE GRAY TO VERY LIGHT GRAY SHALE: DARK GRAY TO PALE GREEN, SILTY, CALCAREOUS. LIMESTONE: WHITE, GRAY, PALE GREEN, CHALKY. GLAUCONITE, FOSSILS AND QUARTZ SAND COMMON THROUGHOUT



ELEVATION (FT.): GL 180.4 KB 190.5 TOTAL DEPTH (FT.) 6041.15
DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED
LOCATION: SE/NE,SEC. 9, T4N, R10W, PERRY CO., MISSISSIPPI

PREPARED JDG DATE 12/22/80
REVISED ____ DATE ____
REVISED ____ DATE ____
APPROVED GHF DATE 12/22/80

T-1607D-0

NATIONAL WASTE TERMINAL
STORAGE PROGRAM
GEOLOGIC EVALUATION GULF
COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX A-1
DEEP BORING DATA SUMMARY
DOE SMITH MRIH-11A
TABLE NO A-1.11
PAGE 4 OF 4
JOB NO MV9700

[redacted]

MISSISSIPPI STUDY AREA

APPENDIX A-2

SHALLOW BORING DATA

The near-surface stratigraphy and structural geology in the vicinity of Cypress Creek and Richton Domes were interpreted from data collected in 85 shallow borings. Data from these borings were used to identify mappable units extending across these domes, to augment surface geologic mapping data, and to delineate the subsurface contact between the Hattiesburg and Citronelle Formations.

The drilling was conducted in three phases. Twenty "100 Series" borings were drilled in the vicinity of Cypress Creek Dome from April through May, 1979, and thirty "200 Series" borings were drilled from March through May, 1980. Twenty-five "200 Series" borings were drilled at Richton Dome from October to December, 1979 and ten "300 Series" borings from February through May of 1980. Boring locations are shown in Figure A-2.1 (Cypress Creek) and Figure A-2.2 (Richton). Boring logs for selected shallow borings are presented in Tables A-2.1 through A-2.19.

The borings were drilled using mud-rotary boring methods. Samples were obtained in accordance with ASTM D 1586-67, "Standard Method for Penetration Test and Split Barrel Sampling of Soils." The N value on the boring logs indicate the number of blows it takes to drive a split spoon sampler the final 305 mm (12 in) of a 457-mm (18-in) penetration. A blow is defined as a

63-kg (140-lb) hammer falling 762 mm (30 in). A 51-mm (2-in) outside diameter (O.D.) split spoon sampler was used.

Samples were generally obtained at 1.5-meter (5-ft) intervals to a depth of 30 meters (100 ft). Below 30 meters (100 ft), samples were generally taken at 3-meter (10-ft) intervals. The samples were classified in general accordance with ASTM D 2487-69, "Standard Test Method for Classification of Soils for Engineering Purposes", and ASTM D 2488-69, "Standard Recommended Practice for Description of Soils (Visual-Manual Procedure)".

Most borings were drilled to depths between 30 and 61 meters (100 and 200 ft) and were terminated at least 6 to 9 meters (20 to 30 ft) beneath the Citronelle-Hattiesburg contact. Following the completion of each boring, geophysical logs were run, including natural gamma ray, single point resistance, short and long normal resistivity, neutron, density, and sonic logs.

Samples for the "300 Series "program at Richton Dome were collected using the same method as for the "200 Series" to an approximate depth of 6 meters (20 ft) into the Hattiesburg Formation. Below this depth, drill cuttings were collected at 3-meter (10-ft) intervals. These borings were drilled to a depth of about 152 meters (500 ft) or, in some cases, to the top of the caprock overlying Richton Dome.

Well screens were installed in several borings for use as piezometers and observation wells. The screens were 51 to 102-mm (2 to 4-in)-diameter slotted polyvinyl chloride (PVC) pipe with a solid PVC riser pipe.

The 19 representative shallow boring logs presented contain data obtained from standard penetration tests, cutting samples, and geophysical logs. Sample descriptions and stratigraphic correlations were made by LETCo geologists.

The symbols listed below, one of which is found following each strata description, are representative of the ASTM soil classification symbols used during soil logging by Law Engineering personnel.

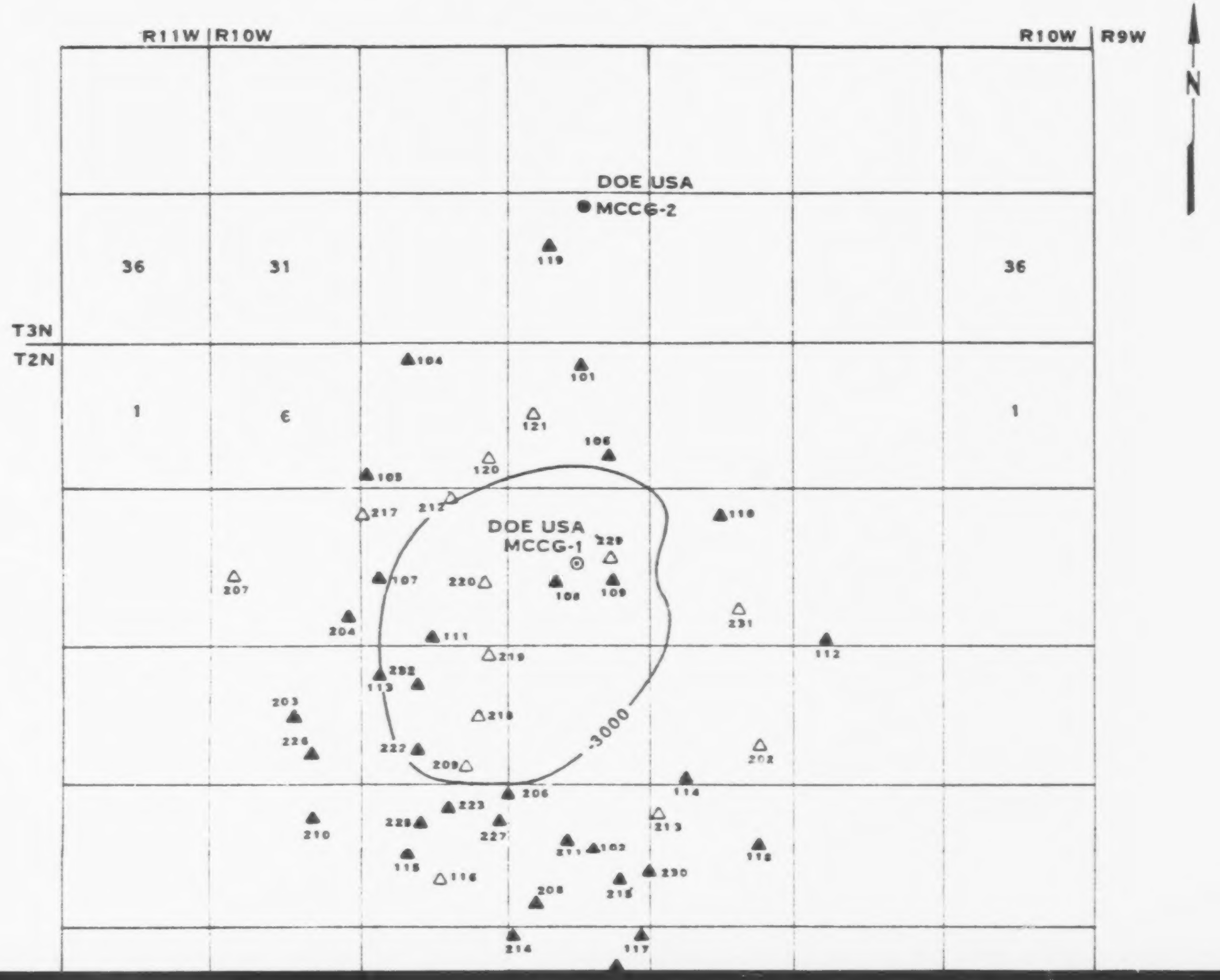
Group Symbol	Soil Type
SM	Silty sands
SP	Poorly graded sands and gravelly sands, little or no fines
SC	Clayey sands
ML	Inorganic silts of low to medium plasticity
CL	Inorganic clays of low to medium plasticity
GM	Silty gravels, gravel-sand-silt mixtures

MISSISSIPPI STUDY AREA
APPENDIX A-2
SHALLOW BORING DATA

KEY TO SYMBOLS USED ON SHALLOW BORING LOGS

▤	CLAY
▥	SILT
░	SAND
☒	UNDISTURBED SAMPLING INTERVAL
▤	WELL SCREEN

34


R11W
R10W
R10W
R9W
N
T3N
T2N
36
31
36
1
6
1
DOE USA
MCCG-2
DOE USA
MCCG-1
-3000
119
104
101
121
106
120
105
217
212
110
229
107
220
108
109
207
204
231
111
112
219
232
113
203
218
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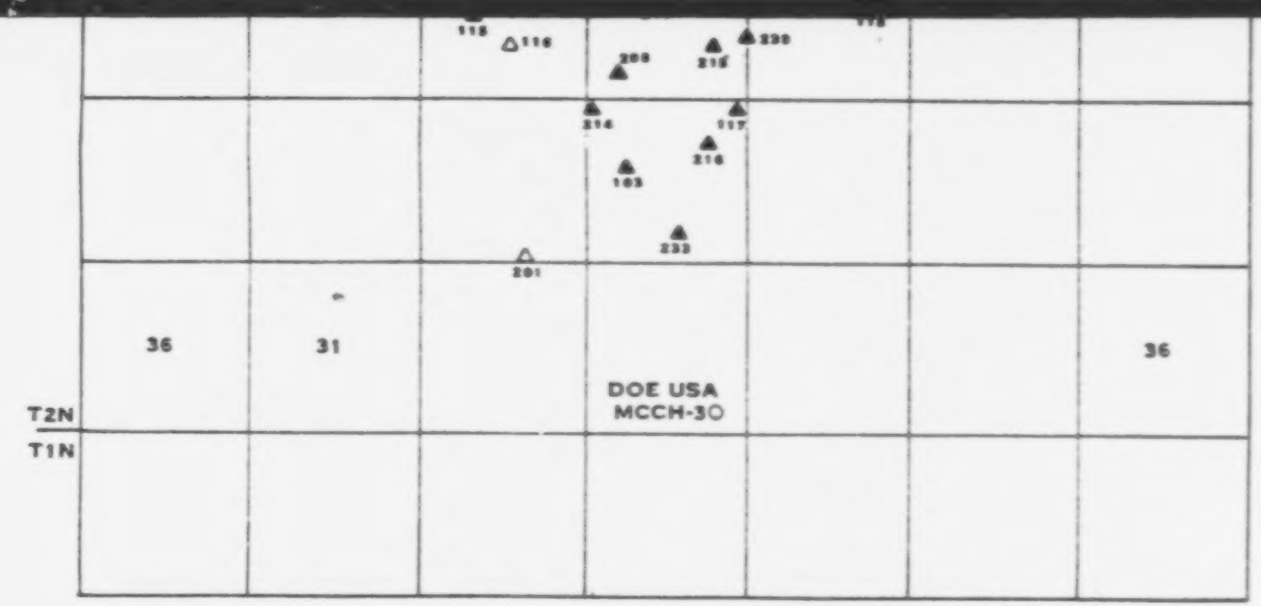
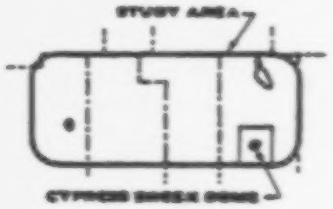
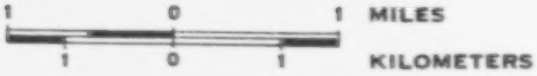
115
116
230
208
215
214
117


115
116
209
215
230
214
117
216
103
233
201
36
31
36
DOE USA
MCCH-3
T2N
T1N

LEGEND

- ○ AREA CHARACTERIZATION HYDROLOGIC BORING
- ● AREA CHARACTERIZATION GEOLOGIC BORING
- ⊙ AREA CHARACTERIZATION SALT CORE BORING
- 210▲ AREA CHARACTERIZATION SHALLOW BORING
- 231△ AREA CHARACTERIZATION SHALLOW BORING-LOCATION NOT SURVEYED
- — -3000 — INTERPRETED SALT CONTOUR-ELEVATION FEET MSL


STUDY AREA
CYPRESS CREEK DOME


1
0
1
MILES
1
0
1
KILOMETERS

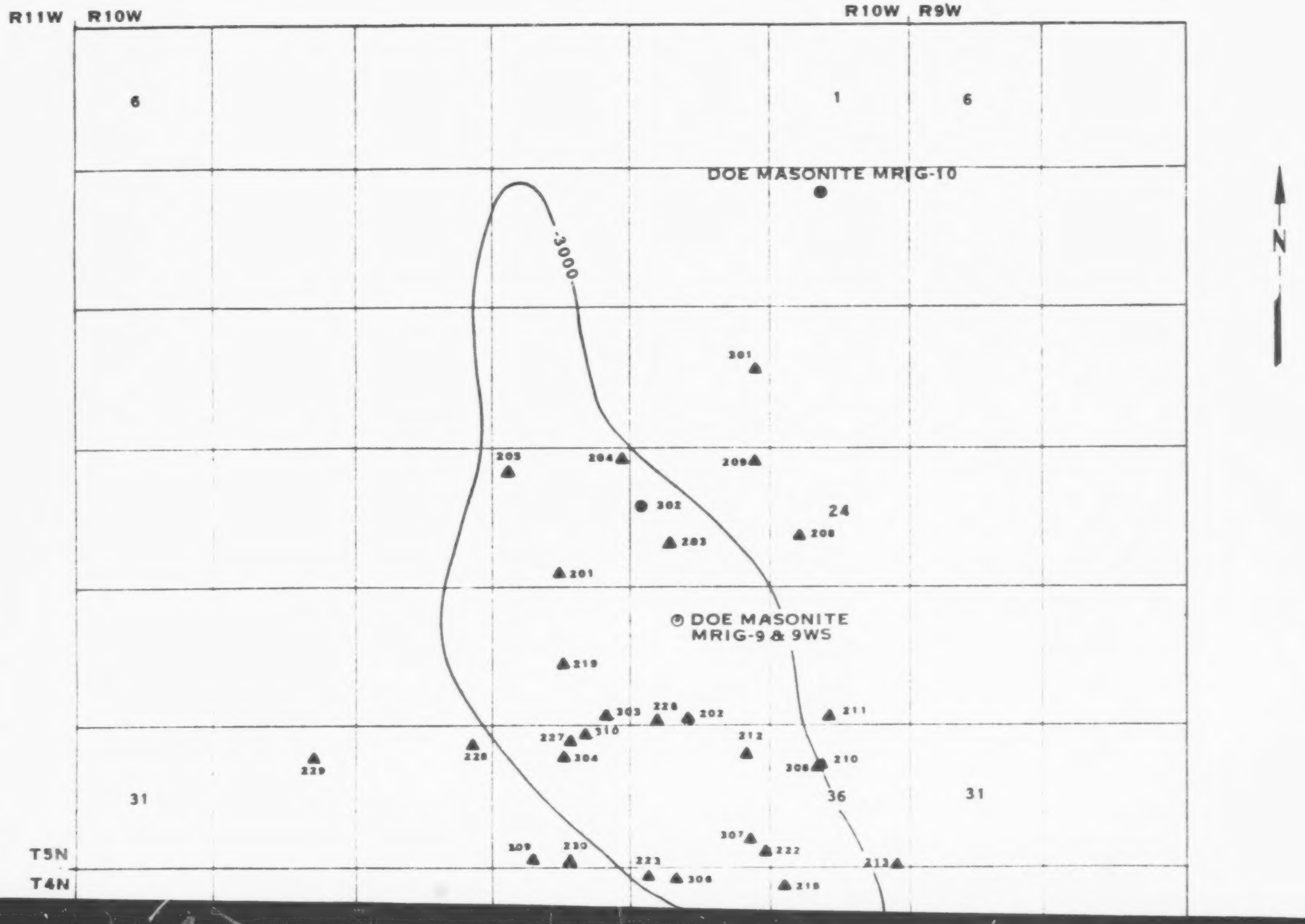
34A

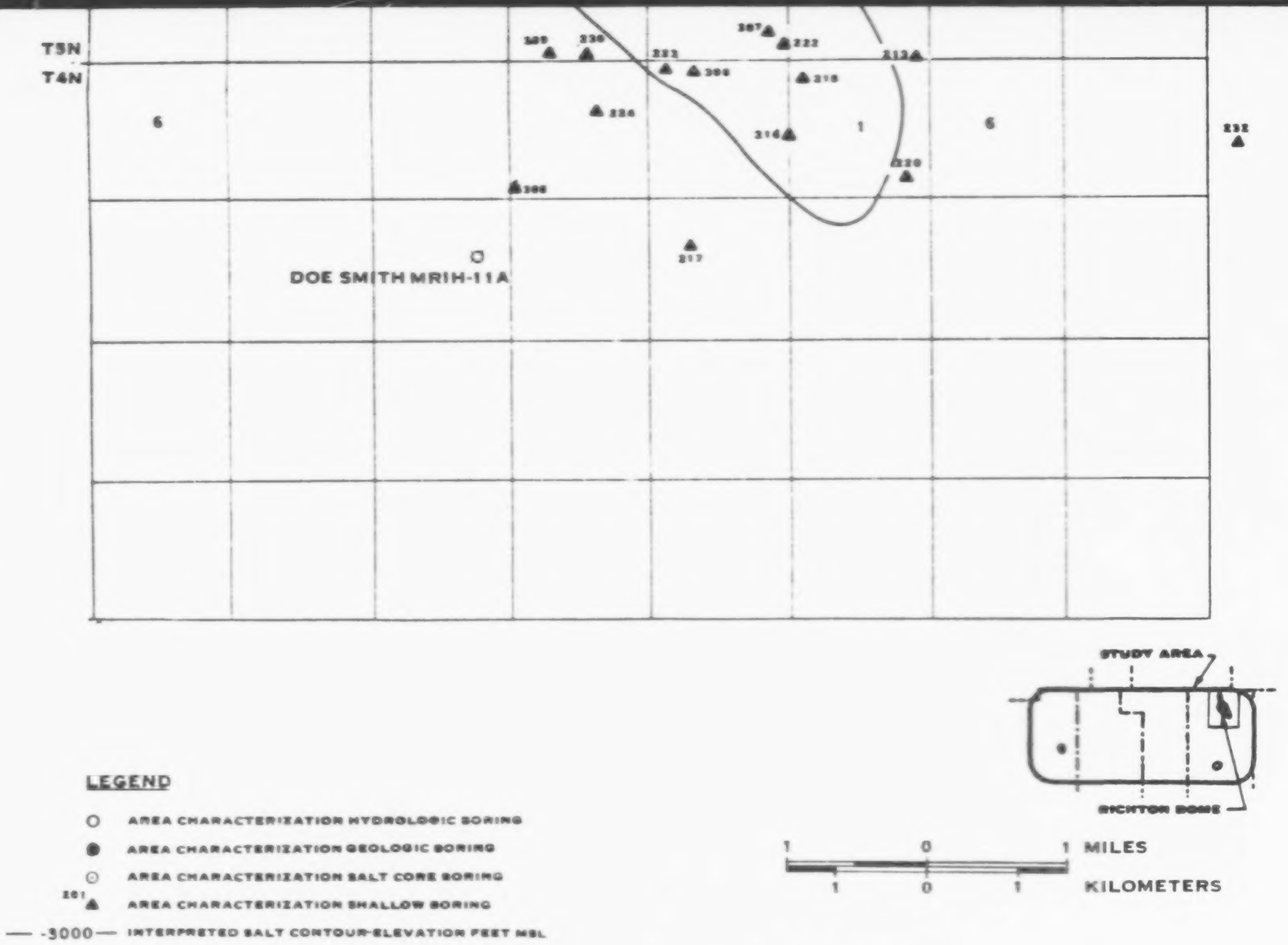
PREPARED J.D.G. DATE 12/22/80
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED GHF DATE 12/22/80
T-1638-0

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX A-2
CYPRESS CREEK DOME
LOCATION MAP OF SHALLOW BORINGS
JOB NO. MV9700 FIGURE A-2.1

35


R11W
R10W
R10W
R9W
6
1
6
DOE MASONITE MRIG-10
-3000
N
301
205
204
209
302
24
208
203
201
DOE MASONITE MRIG-9 & 9WS
219
303
226
202
211
227
310
212
229
228
304
306
210
31
36
31
307
222
T5N
T4N
309
230
223
306
213
218


T5N
T4N
6
230
207
222
212
226
216
1
6
232
220
217
DOE SMITH MRIH-11A
STUDY AREA
RICHTON DOME
1 0 1 MILES
1 0 1 KILOMETERS
LEGEND
○ AREA CHARACTERIZATION HYDROLOGIC BORING
● AREA CHARACTERIZATION GEOLOGIC BORING
⊙ AREA CHARACTERIZATION SALT CORE BORING
201 ▲ AREA CHARACTERIZATION SHALLOW BORING
— -3000 — INTERPRETED SALT CONTOUR-ELEVATION FEET MSL

35A

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REVISED		DATE	
REVISED		DATE	
APPROVED	GHF	DATE	12/22/80

T-1639-0

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COAST SALT DOMES

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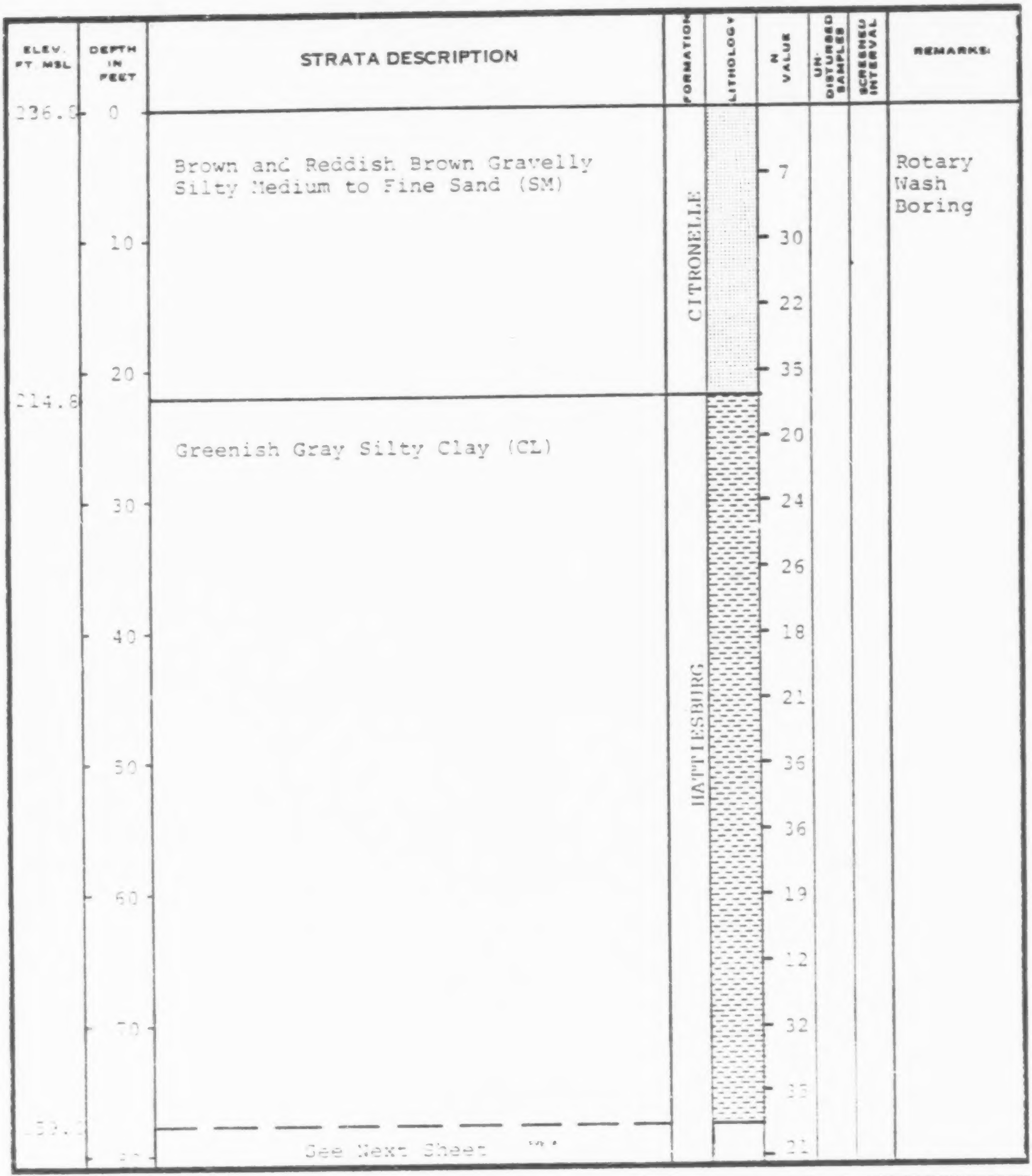
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX A-2
RICHTON DOME
LOCATION MAP OF SHALLOW BORINGS

JOB NO. MV9700 FIGURE A-2.2



ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
236.8	0	Brown and Reddish Brown Gravelly Silty Medium to Fine Sand (SM)	CITRONELLE		7 30 22 35			Rotary Wash Boring
214.8		Greenish Gray Silty Clay (CL)	HATTIESBURG		20 24 26 18 21 36 36 19 12 32 33			
159.2		See Next Sheet			21			

Depth scale: 0, 10, 20, 30, 40, 50, 60, 70, 80

Location: Sec 13 T2N R10W
Perry County, Mississippi
Completed 4-27-80

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REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

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MARIETTA GEORGIA

JOB NO. MV9700 T-1502A-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
CYPRESS CREEK DOME

BORING MCCG-203

TABLE NO. A-2.1
PAGE 1 OF 2

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ELEV. FT MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	80	Greenish Gray Fine Sandy Clayey Silt (ML)	HATTIESBURG		18			
	90				28			
141.0		Gray Silty Medium Sand (SM)			43			
136.3	100				35			
		Boring Terminated at 99.0 Feet						
	110							
	120							
	130							
	140							
	150							
	160							

PREPARED ______________ DATE ________
REVISED ______________ DATE ________
REVISED ______________ DATE ________
APPROVED ______________ DATE ________

NATIONAL WASTE TERMINAL
STORAGE PROGRAM
GEOLOGIC EVALUATION GULF
COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1502B-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
CYPRESS CREEK DOME

BORING MCCG-203

TABLE NO. A-2.1
PAGE 2 OF 2

BEST DOCUMENT AVAILABLE

[redacted] 37

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
225.7	0	Red, Orange, Yellow, and Gray Mottled Silty Fine Sand (SM)	CITRONELLE		15			Rotary Wash Boring
	10				15			
					11			
	20				9			
					5			
	30				17			
					17			
188.2	40	Yellow and Red Slightly Gravelly Silty Clayey Medium to Fine Sand (SP and SC)			2			
					3			
	50				4			
					7			
	60				5			
					23			
158.2	70	Yellow, Red, and Gray Silty Medium to Fine Sand (SM)			34			
					47			
147.7	80	See Next Sheet			[illegible]			

Location: Sec 21 T2N R10W
Perry County, Mississippi
Completed 4-22-80

PREPARED		DATE	
REVISED		DATE	
REVISED		DATE	
APPROVED		DATE	

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STORAGE PROGRAM
GEOLOGIC EVALUATION GULF
COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1503A-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
CYPRESS CREEK DOME

BORING MCCG-206

TABLE NO. A-2.2
PAGE 1 OF 2

38

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ELEV. FT MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
	80							
		Grayish Green Clayey Fine Sandy Silt (ML)			26			
	90				35			
					30			
127.7	100				27			
		Grayish Green Clayey Silty Medium to Fine Sand (SM)						
	110				32			
	120		HATTIESBURG		42			
	130				34			
	140				67			
	150				98			
65.2	160	Boring Terminated at 160.5 Ft.			31			

PREPARED	DATE
REVISED	DATE
REVISED	DATE
APPROVED	DATE

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-15038-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
CYPRESS CREEK DOME

BORING MCCG-206

TABLE NO. A-2.2
PAGE 2 OF 2

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
188.0*	0	Blackish Brown Organic Silt With Wood Fragments (ML)	ALLUVIUM		0 0			Rotary Wash Boring
182.0	10	Brownish Gray Gravelly Silty Coarse to Fine Sand (SM)			21 22			
	20	Brown, Gray and Yellow Gravelly Fine to Coarse Sand	CITRONELLE		16 1			
165.5	30 40	Grayish Orange Clayey Silty Fine to Medium Sand (SC)			5 0 2 17			
146.0	50 60 70	Yellowish Gray to Greenish Gray Fine Sandy Silty Clay to Clayey Silt(CL to ML)	HATTIESBURG		22 24 21 24 20 21			
116.7		Yellowish Gray to Yellowish Orange Silty Medium to Fine Sand (SM)			[illegible]			
[illegible]	[illegible]	See Next Sheet			[illegible]			

Location: Sec 17 T2N R10W
Perry County, Mississippi
Completed 5-9-80 *Ground
Elevation Est. from Topo Map

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

NATIONAL WASTE TERMINAL
STORAGE PROGRAM
GEOLOGIC EVALUATION GULF
COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1504A 0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
CYPRESS CREEK DOME

BORING MCCG-209

TABLE NO. A-2.3
PAGE 1 OF 2

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BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	80	Yellow, Brown, and Greenish Gray Fine Sandy Silt Clay (CL)	HATTIESBURG	▤	50			
100.0	90	Gray Silty Fine Sand (SM)		░	100/9"			
94.0		Greenish Gray Fine Sandy Silty Clay (CL)		▤	59 56			
87.5	100	Boring Terminated at 100.5 Feet						
	110							
	120							
	130							
	140							
	150							
	160							

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
APPROVED ________ DATE ______

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1504B-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
CYPRESS CREEK DOME

BORING MCCG-209

TABLE NO. A-2.3
PAGE 2 OF 2

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
212.0*	0	Grayish Orange Silty Fine Sand (SM)	ALLUVIUM		34			Rotary Wash Boring
208.0	10	Gray, Reddish Orange and Yellowish Orange Fine Sandy Silty Clay (CL)	CITRONELLE		8 5 6			
196.0	20 30 40	Red, Orange, and Gray Silty Medium to Fine Sand (SM)	CITRONELLE		6 8 28 12 24			
170.0	50 60 70 80	Olive Green and Yellowish Brown Silty Clay (CL)	HATTIESBURG		21 22 30 28 39 49 37 39			

Location Sec 8 T2N R10W
Perry County, Mississippi
Completed 4-30-80 * Ground
Elevation Est. from Topo Map

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1505A-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
CYPRESS CREEK DOME

BORING MCCG-212

TABLE NO. A-2.4
PAGE 1 OF 2

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	80	Olive Green and Yellowish Brown Silty Clay (CL)	HATTIES-BURG	▨				
126.3					42			
		Boring Terminated at 85.5 Feet						
	90							
	100							
	110							
	120							
	130							
	140							
	150							
	160							

PREPARED ________ DATE ______ REVISED ________ DATE ______ REVISED ________ DATE ______ APPROVED ________ DATE ______	NATIONAL WASTE TERMINAL STORAGE PROGRAM GEOLOGIC EVALUATION GULF COAST SALT DOMES LAW ENGINEERING TESTING COMPANY MARIETTA GEORGIA	SHALLOW BORING RECORD MISSISSIPPI STUDY AREA CYPRESS CREEK DOME BORING MCCG-212
	JOB NO. MV9300 T-1505B-0	TABLE NO. A-2.4 PAGE 2 OF 2

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
243.5	0	Gray to Reddish Brown Fine Sandy Clayey Silt (ML)	CITRONELLE		22			Rotary Wash Boring
236.0	10 20 30 40	Gray to Reddish Brown Clayey Silty Fine Sand (SM)			14 12 11 17 18 12 22			
201.5	50 60	Reddish Brown Gravelly Medium to Fine Sand (SW)			42 25 36 32			
181.5		Yellowish Gray Fine Sand Silty Clay (CL)			10			
176.5	70 80	Reddish Brown, Tan, and Grayish Green Silty Medium to Fine Sand (SM)			34 25 66			

BEST DOCUMENT AVAILABLE

Location: Sec 28 T2N R10W
Perry County, Mississippi
Completed 4-17-80

PREPARED		DATE	
REVISED		DATE	
REVISED		DATE	
APPROVED		DATE	

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1506A-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
CYPRESS CREEK DOME

BORING MCCG-216

TABLE NO. A-2.5
PAGE 1 OF 3

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UNDISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	80							
		Reddish Brown, Tan, and Grayish Green Silty Medium to Fine Sand (SM)	CITRONELLE		49			
	90				51			
					60			
	100				94/9"			
	110				155			
	120				32			
	130				45			
	140				63			
	150				68			
88.5		See Next Sheet						
	160				150/11"			

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
APPROVED ________ DATE ______

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1506B-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
CYPRESS CREEK DOME

BORING MCCG-216

TABLE NO. A-2.5
PAGE 2 OF 3

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UNDISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	160	Yellowish Gray and Reddish Brown Gravelly Slightly Silty Medium to Fine Sand (SP)	CITRONELLE	░				
	170			░	100/5"			
	180			░	100/6"			
58.5								
	190	Grayish Green Fine Sandy Silty Clay (CL)	HATTIESBURG	▤	41			
	200			▤	87			
33.0	210			▤	64			
		Boring Terminated at 210.5 Feet						
	220							
	230							
	240							

PREPARED ________ DATE ________
REVISED ________ DATE ________
REVISED ________ DATE ________
APPROVED ________ DATE ________

NATIONAL WASTE TERMINAL
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GEOLOGIC EVALUATION GULF
COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA, GEORGIA

JOB NO. MV9700 T-1506C-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
CYPRESS CREEK DOME

BORING MCCG-216

TABLE NO. A-2.5
PAGE 3 OF 3

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ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
* 233.0	0	Reddish Brown and Yellowish Brown Silty Fine Sand (SM)	CITRONELLE					Rotary Wash Boring
					20			
	10				20			
					19			
	20				25			
					20			
	30				14			
					10			
	40				8			
					5			
	50				3			
					9			
	60				14			
					18			
215.5		Reddish Brown Gravelly Silty Medium to Fine Sand (SM)						
	70				21			
					15			
205.5		See Next Sheet						
	80				12			

Location: Sec 7 T2N R10W
Perry County, Mississippi
Completed 4-30-80 *Ground
Surface Est. from Topo Map

PREPARED ____________ DATE ________
REVISED ____________ DATE ________
REVISED ____________ DATE ________
APPROVED ____________ DATE ________

NATIONAL WASTE TERMINAL
STORAGE PROGRAM
GEOLOGIC EVALUATION GULF
COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1507A-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
CYPRESS CREEK DOME
BORING MCCG-217

TABLE NO. A-2.6
PAGE 1 OF 2

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	80	Reddish Brown Slightly Silty Fine Sand with Interbedded Reddish Brown Silty Clay (SM with CL)	CITRONELLE					
					9			
	90				28			
					28			
	100				25			
128.0		Grayish Green Fine Sandy Silty Clay (CL)	HATTIESBURG					
	110				20			
	120				24			
	130				19			
	140				29			
132.5	150				37			
		Boring Terminated at 150.5 Feet						
	160							

BEST DOCUMENT AVAILABLE

PREPARED ______ DATE ______ REVISED ______ DATE ______ REVISED ______ DATE ______ APPROVED ______ DATE ______	NATIONAL WASTE TERMINAL STORAGE PROGRAM GEOLOGIC EVALUATION GULF COAST SALT DOMES LAW ENGINEERING TESTING COMPANY MARIETTA GEORGIA	SHALLOW BORING RECORD MISSISSIPPI STUDY AREA CYPRESS CREEK DOME BORING MCCG-217
	JOB NO. MV9700 T-1507B-0	TABLE NO. A-2.6 PAGE 2 OF 2

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
193.0*	0	Dark Gray Organic Clayey Silt with Roots (ML)	ALLUVIUM		2 9			Rotary Wash Boring
	10	Gray and Yellowish Orange Fine Sandy Clayey Silt (ML)			6 4 4 6 10 9			
171.0	20	Olive Green and Gray Silty Fine Sand (SM)			7 3 7			
165.0	30	Gray and Yellowish Orange Silty Clay to Clayey Silt (CL to ML)			4 0 0			
157.0		Gray and Yellowish Orange Silty Fine Sand (SM)			8 6			
152.0	40	Gray to Reddish Orange Fine Sandy Silty Clay (CL)	CITRONELLE		7			
149.0	50	Reddish Orange Clayey Silty Fine Sand (SM)			6 11 3 19 5 29 5			
132.0	60	Reddish Orange and Yellowish Orange Silty Gravelly Medium to Fine Sand (SW)			40 32 49 57			
122.0	70 80	Yellowish Orange and Grayish Orange Silty Medium to Fine Sand (SM)			9 57 16 71			

Location: Sec 17 T2N R10W
Perry County, Mississippi
Completed 4-24-80 * Ground
Elevation Est. from Topo Map

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
APPROVED ________ DATE ______

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1508A-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
CYPRESS CREEK DOME

BORING MCCG-219

TABLE NO. A-2.7
PAGE 1 OF 2

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
	80							
112.0		Yellowish and Reddish Orange Gravelly Clayey Silty Medium to Fine Sand (SM)	CITRONELLE		7			
108.5		Reddish Orange and Grayish Orange Silty Medium to Fine Sand (SM)			28			
					35			
					22			
102.0	90	Greenish Gray, Red and Orange Mottled Silt Clay (CL)	HATTIESBURG		37			
					53			
	100				52			
	110				52			
	120				75			
	130				43			
52.5	140				44			
		Boring Terminated at 140.5 feet						
	150							
	160							

PREPARED ________ DATE ______ REVISED ________ DATE ______ REVISED ________ DATE ______ APPROVED ________ DATE ______	NATIONAL WASTE TERMINAL STORAGE PROGRAM GEOLOGIC EVALUATION GULF COAST SALT DOMES LAW ENGINEERING TESTING COMPANY MARIETTA GEORGIA JOB NO. MV9700 T-1508B-0	SHALLOW BORING RECORD MISSISSIPPI STUDY AREA CYPRESS CREEK DOME BORING MCCG-219 TABLE NO. A-2.7 PAGE 2 OF 2

BEST DOCUMENT AVAILABLE

ELEV. FT MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	REMARKS:
200.0*	0	Red, Orange, Brown, and Gray Fine Sandy Clayey Silt to Silty Clay (ML to CL)	ALLUVIUM	▨	Rotary Wash Boring
177.5		Dark Greenish Gray Very Fine to Medium Sandy Silt (ML)			
157.3		Dark Greenish Gray Fine Sandy Silty Clay (CL)		▨	
149.0		Olive, Gray and Dark Orange Fine Sandy Silty Clay (CL)	CITRONELLE	▨	
137.5		Olive Gray and Yellowish Orange Silty Medium to Fine Sand (SM)			

DEPTH IN FEET: 0, 10, 20, 30, 40, 50, 60, 70, 80

N VALUE: 13, 17, 25, 22, 26, 18, 36, 16, 29, 17, 18, 8, 2, -, 23, 26, 35, [illegible]

UN-DISTURBED SAMPLES

SCREENED INTERVAL

Location: Sec 8 T2N R10W
Perry County, Mississippi
Completed 4-29-80 *Ground
Elevation Est. from Topo Map

PREPARED		DATE	
REVISED		DATE	
REVISED		DATE	
APPROVED		DATE	

NATIONAL WASTE TERMINAL
STORAGE PROGRAM
GEOLOGIC EVALUATION GULF
COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1509A-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
CYPRESS CREEK DOME

BORING MCCG-220

TABLE NO. A-2.3
PAGE 1 OF 2

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	80	See Preceeding Sheet	CITRONELLE					
116.		Yellowish Orange and Olive Green Gravelly Silty Coarse to Fine Sand (SM)			43			
	90				44			
107.		Olive Green Silty Fine Sandy Clay and Fine Sandy Silt (CL and ML)	HATTIESBURG		30			
	100				45			
	110				37			
73.5	120				46			
		Boring Terminated at 120.5 Feet						
	130							
	140							
	150							
	160							

PREPARED ________	DATE ______
REVISED ________	DATE ______
REVISED ________	DATE ______
APPROVED ________	DATE ______

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1509B-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
CYPRESS CREEK DOME

BORING MCCG-220

TABLE NO. A-2.3
PAGE 2 OF 2

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
232.2	0	Reddish Brown, Yellow and Orange Mottled Slightly Clayey Fine Sandy Silt (ML)	CITRONELLE					Rotary Wash Boring
	5				15			
	10				24			
220.2	12	Reddish Brown and Yellowish Brown Clayey Silty Fine Sand (SM)						
	15				12			
	20				9			
	25				7			
	30				5			
	35				11			
	40				24			
187.2	45	Reddish Brown Gravelly Silty Coarse to Medium Sand (SM)			12			
	50				14			
177.2	55	Reddish Brown Silty Medium to Fine Sand (SM)			18			
	60				20			
	65				24			
	70				16			
	75				29			
	80				[illegible]			

Location: Sec 17 T1N R10W
Perry County, Mississippi
Completed 4-30-80

PREPARED ____________ DATE ________
REVISED ____________ DATE ________
REVISED ____________ DATE ________
APPROVED ____________ DATE ________

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1510A-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
CYPRESS CREEK DOME

BORING MCCG-232

TABLE NO. A-2.9
PAGE 1 OF 2

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	80	Reddish Brown Silty Medium to Fine Sand (SM)	CITRONELLE		27 43 99 107			
	90							
	100							
130.2		Grayish Green Fine Sandy Silty Clay (CL)	HATTIESBURG		19			
	110							
115.2		Grayish Green Clayey Silty Fine Sand (SM)			47			
	120							
108.2		Olive Green and Gray Clayey Sandy Silt (ML)			62			
101.7	130	Boring Terminated at 130.5 Feet						
	140							
	150							
	160							

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REVISED ______ DATE ______
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NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-15108-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
CYPRESS CREEK DOME

BORING MCCG-232

TABLE NO. A-2.9
PAGE 2 OF 2

[redacted]

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
281.5	0	Yellowish Orange Coarse to Fine Gravelly Sandy Clay and Reddish Brown Medium to Fine Silty Sand (CL and SM)	CITRONELLE					Rotary wash Boring
					23			
271.5	10	Grayish Tan and Greenish Gray Fine Sandy Silty Clay (CL)	HATTIESBURG		30			
					14			
	20				10			
					8			
	30				12			
					15			
	40				16			
					15			
	50				36			
					36			
	60				38			
					42			
	70				36			
					31			
	80				41			

Location: Sec 26 T5N R10W
Perry County, Mississippi
Completed 10-19-79

PREPARED		DATE	
REVISED		DATE	
REVISED		DATE	
APPROVED		DATE	

NATIONAL WASTE TERMINAL
STORAGE PROGRAM
GEOLOGIC EVALUATION GULF
COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1511A-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
RICHTON DOME

BORING MRIG-202

TABLE NO. A-2.10
PAGE 1 OF 3

[redacted]

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	80	Grayish Tan and Greenish Gray Fine Sandy Silty Clay (CL)	HATTIESBURG		37 29		▤	
191.0	90	Greenish Gray Silty Clayey Coarse to Fine Sand (SM to SC)			83 100/12"		▤	
176.5	100	Greenish Gray Silty Clay (CL and CL-CH)			26 47			
160.5	120	Gray Silty Medium to Fine Sand Interbedded with Greenish Gray Fine Sandy Silty Clay (SM with CL)			100/7"			
151.5	130	Greenish Gray Fine Sandy Silty Clay (CL)			45			
141.5	140	Gray Silty Medium to Fine Sand (SP-SM)			100/6"			
127.5	150	See Next Sheet			63			
	160							

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PREPARED ________ DATE ________
REVISED ________ DATE ________
REVISED ________ DATE ________
APPROVED ________ DATE ________

NATIONAL WASTE TERMINAL
STORAGE PROGRAM
GEOLOGIC EVALUATION GULF
COAST SALT DOMES

LET LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1511B-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
RICHTON DOME

BORING MRIG-202

TABLE NO. A-2.10
PAGE 2 OF 3

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ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UNDISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	160	Light and Dark Brown Mottled and Greenish Gray Fine Sandy Silty Clay Interbedded with Gray Silty Fine Sand (CL with SM)	HATTIESBURG					
	170				68			
	180				70			
	190				21			
81.4	200	Boring Terminated at 200.1 Feet			58/7"			
	210							
	220							
	230							
	240							

PREPARED ________	DATE ________	
REVISED ________	DATE ________	
REVISED ________	DATE ________	
APPROVED ________	DATE ________	

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1511C-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
RICHTON DOME

BORING MRIG-202

TABLE NO. A-2.10
PAGE 3 OF 3

[redacted]

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
280.5	0 10	Reddish Brown Coarse to Fine Sandy Clay (CL)	CITRONELLE		12 14 13			Rotary Wash Boring
263.5	20	Reddish Brown and Tan Clayey Silty Coarse to Fine Sand (SM)	CITRONELLE		18 29			
253.5	30 40 50 60 70 80	Greenish Gray, Red, and Brown Mottled Fine Sandy Silty Clay (CL)	HATTIESBURG		[illegible] 8 16 23 19 [illegible] 18 [illegible] 23 [illegible] [illegible]			

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Location: Sec 35 T5N R10W
Perry County, Mississippi
Completed 11-7-79

PREPARED		DATE	
REVISED		DATE	
REVISED		DATE	
APPROVED		DATE	

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

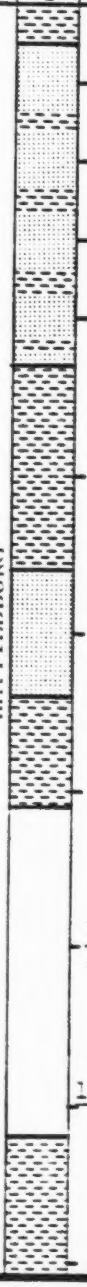
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1512A-3

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
RICHTON DOME
BORING MRIG-212

TABLE NO. A-2.11
PAGE 1 OF 2

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	80	See Preceeding Sheet					
198.0	90 100	Tan and Yellowish Brown Silty Coarse to Fine Sand Interbedded with Yellowish Brown and Tan Mottled to Dark Gray Silty Clay (SM and CL)	HATTIESBURG	16 50/3" 49 79/11"			
177.5	110	Tan and Brown Mottled Silty Clay (CL)		30			
164.5	120	Greenish Gray Clayey Silty Medium to Fine Sand (SM)		71			
156.5	130	Gray Fine Sandy Silty Clay (CL)		50			
149.5	140 150	No Samples Recovered		73/10" 100/7"			
128.5		Greenish Gray to Yellow, Green and Brown Mottled Fine Sandy Silty Clay to Silty Clay (CL)					



PREPARED ________	DATE ________
REVISED ________	DATE ________
REVISED ________	DATE ________
APPROVED ________	DATE ________

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV97.00
T-1512B-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
RICHTON DOME
BORING MRIG-212

TABLE NO. A-2.11
PAGE 2 OF 3

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UNDISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
	160	Greenish Gray to Yellow, Green and Brown Mottled Fine Sandy Silty Clay to Silty Clay (CL)	HATTIESBURG	▨				
	170			▨	78/9"			
100.0	180	Boring Terminated at 180.5 Feet			51			
	190							
	200							
	210							
	220							
	230							
	240							

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PREPARED ________ DATE ________
REVISED ________ DATE ________
REVISED ________ DATE ________
APPROVED ________ DATE ________

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

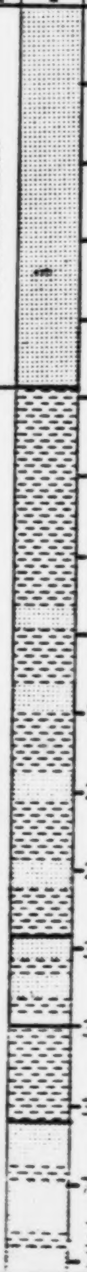
JOB NO. MV9700 T-1512C-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
RICHTON DOME
BORING MRIG-212

TABLE NO. A-2.11
PAGE 3 OF 3

BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
220.2	0 10 20	Reddish Brown and Yellowish Brown Banded Clayey Silty Medium to Fine Sand (SM)	CITRONELLE		10 21 33 22			Rotary Wash Boring
196.0	30 40 50	Greenish Gray and Reddish Brown Mottled Silty Clay Interbedded with Greenish Gray Silty Clayey Fine Sand (CL with SC)	HATTIESBURG		8 11 17 23 34 22 26			
161.0	60	Greenish Gray Silty Medium to Fine Sand Interbedded with Fine Sandy Silty Clay (SM with CL)			30			
155.2		Greenish Gray Silty Clay (CL)			36			
149.2	70 80	Greenish Gray Clayey Silty Fine Sand Interbedded with Greenish Gray Fine Sandy Silty Clay (SM with CL)			32 70 73/11"			



Location: Sec 1 T4N R10W
Perry County, Mississippi
Completed 11-17-79

PREPARED		DATE	
REVISED		DATE	
REVISED		DATE	
APPROVED		DATE	

NATIONAL WASTE TERMINAL
STORAGE PROGRAM
GEOLOGIC EVALUATION GULF
COAST SALT DOMES

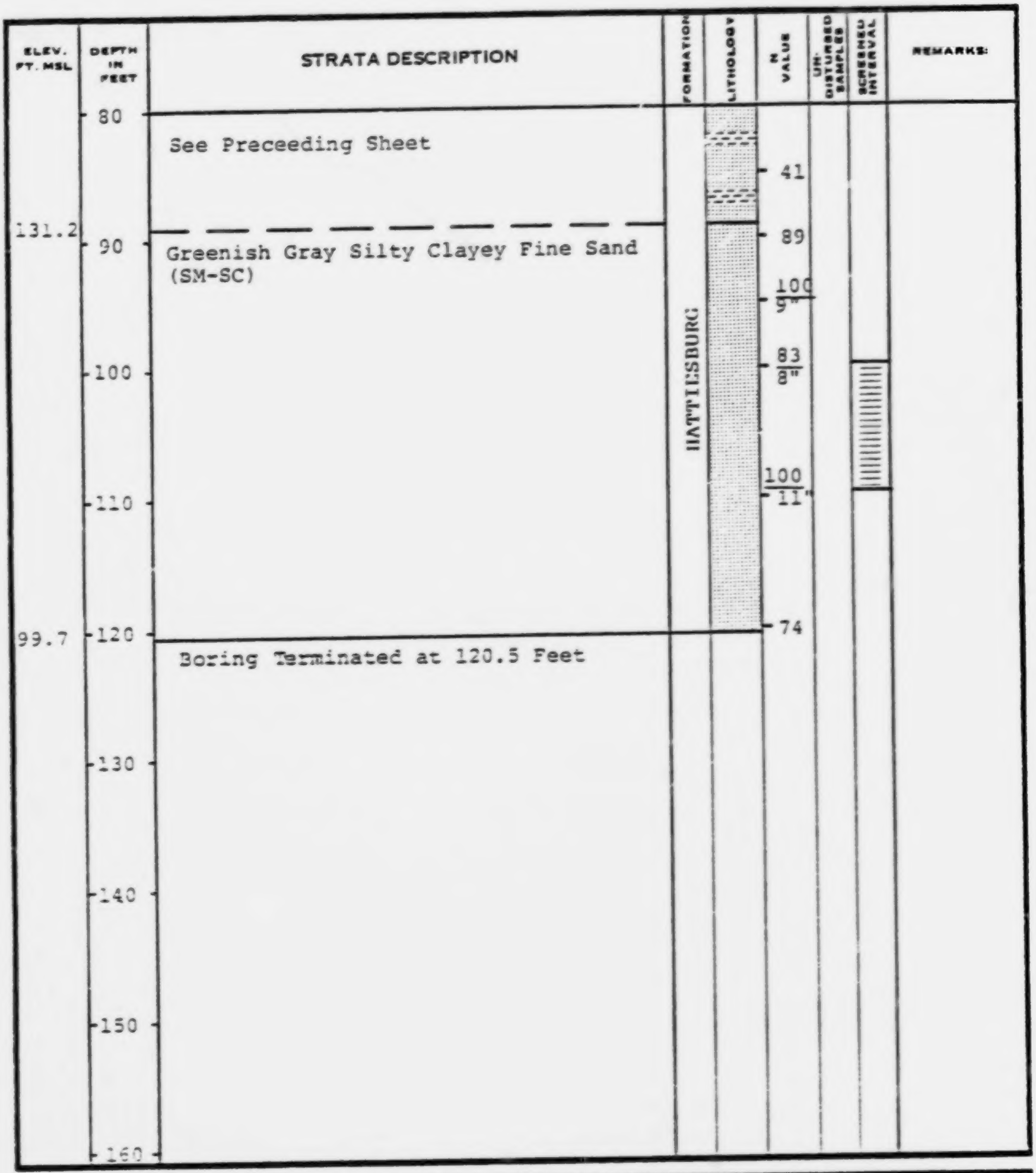
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1513A-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
RICHTON DOME

BORING MRIG-215

TABLE NO. A-2.12
PAGE 1 OF 2


ELEV. FT. MSL
DEPTH IN FEET
STRATA DESCRIPTION
FORMATION
LITHOLOGY
N VALUE
UN-DISTURBED SAMPLES
SCREENED INTERVAL
REMARKS:
80
90
100
110
120
130
140
150
160
131.2
99.7
HATTIESBURG
41
89
100/9"
83/8"
100/11"
74

See Preceeding Sheet

Greenish Gray Silty Clayey Fine Sand (SM-SC)

Boring Terminated at 120.5 Feet

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1513B-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
RICHTON DOME
BORING MRIG-215

TABLE NO. A-2.12
PAGE 2 OF 2

BEST DOCUMENT AVAILABLE

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ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	REMARKS
218.5	0	Brown, Tan, and Grayish White Gravelly Silty Medium to Fine Sand (SM)	CITRONELLE	Rotary Wash Boring
181.5		Greenish Gray Fine Sandy Silty Clay (CL)	HATTIESBURG	
172.5		Gray Clayey Silty Fine Sand (SP-SM)		
164.5		Greenish Gray Fine Sandy Silty Clay (CL)		
157.5		Gray Silty and Clayey Medium to Fine Sand (SC and SM)		
141.5		Dark Gray Fine Sandy Clayey Silt (ML)		

DEPTH IN FEET	N VALUE
	6
10	20
	18
20	32
	25
30	23
	28
40	15
	25
50	40
	41
60	39
	59/10"
70	73/7"
	100
80	45

LITHOLOGY	UN-DISTURBED SAMPLES	SCREENED INTERVAL

Location: Sec 1 T4N R10W
Perry County, Mississippi
Completed 11-15-79

PREPARED ________ DATE ________
REVISED ________ DATE ________
REVISED ________ DATE ________
APPROVED ________ DATE ________

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

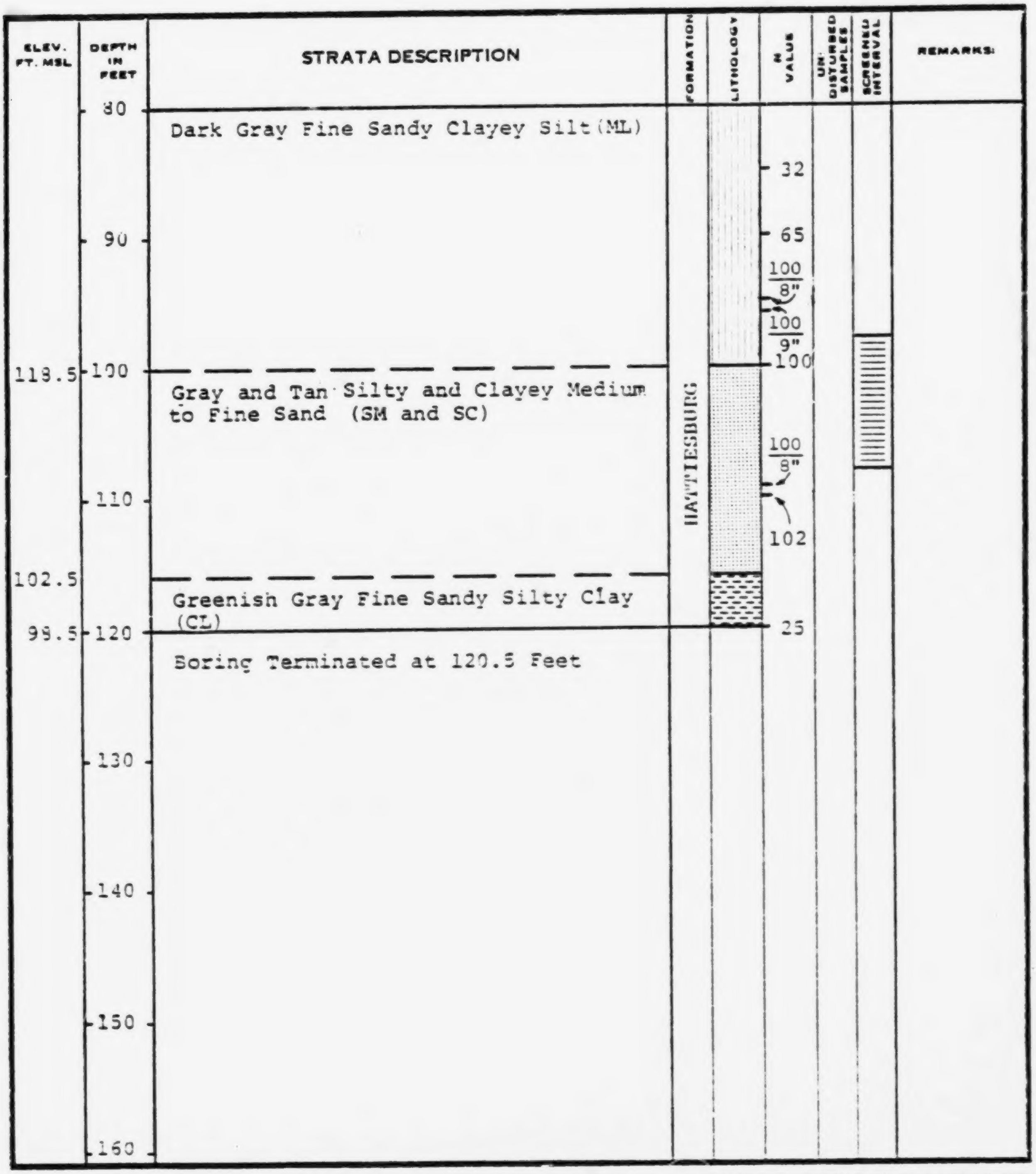
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1514A-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
RICHTON DOME

BORING MRIG-216

TABLE NO. A-2.13
PAGE 1 OF 2


ELEV. FT. MSL
DEPTH IN FEET
STRATA DESCRIPTION
FORMATION
LITHOLOGY
N VALUE
UN-DISTURBED SAMPLES
SCREENED INTERVAL
REMARKS:
80
90
118.5
100
110
102.5
99.5
120
130
140
150
160
HATTIESBURG
32
65
100/8"
100/9"
100
100/8"
102
25

Dark Gray Fine Sandy Clayey Silt (ML)

Gray and Tan Silty and Clayey Medium to Fine Sand (SM and SC)

Greenish Gray Fine Sandy Silty Clay (CL)

Boring Terminated at 120.5 Feet

PREPARED ____________ DATE ______
REVISED ____________ DATE ______
REVISED ____________ DATE ______
APPROVED ____________ DATE ______

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

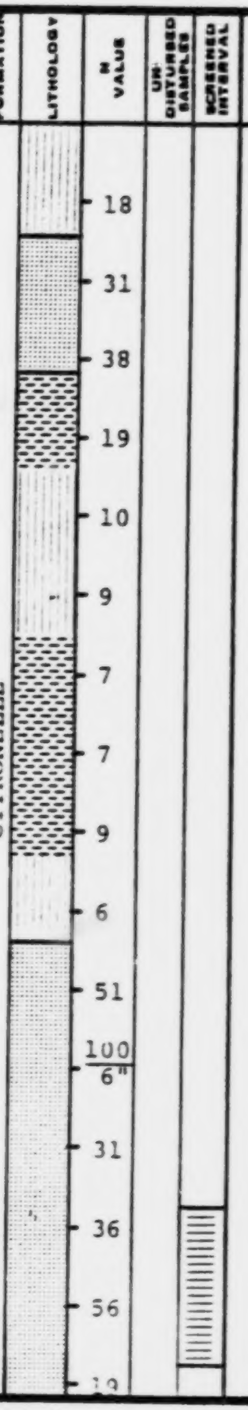
JOB NO. MV9700
T-1514B-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
RICHTON DOME

BORING MRIG-216

TABLE NO. A-2.13
PAGE 2 OF 2

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	REMARKS
215.7	0	Yellow, Red, and Brown Mottled Gravelly Sandy Clayey Silt (ML)	CITRONELLE	Rotary Wash Boring
208.5	10	Yellow, Red, and Brown Gravelly Silty Medium to Fine Sand (SM)		
199.3	20 30 40 50	Grayish Tan, Yellowish and Reddish Brown Mottled Fine Sandy Clayey Silt and Silty Clay (CL and ML)		
163.7	60 70	Yellowish and Reddish Brown to Grayish Tan Gravelly Clayey Silty Coarse to Fine Sand (SM)		
137.7	80	See Next Sheet		



N VALUE
18
31
38
19
10
9
7
7
9
6
51
100/6"
31
36
56
19

Location: Sec 1 T4N R10W
Perry County, Mississippi
Completed 11-5-79

PREPARED		DATE	
REVISED		DATE	
REVISED		DATE	
APPROVED		DATE	

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1515A-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
RICHTON DOME

BORING MRIG-220

TABLE NO. A -2.14
PAGE 1 OF 2

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	80		CITRONELLE					
		Yellowish Brown Silty Fine Sand (SP-SM)			48			
	90				34			
120.7		Grayish Tan Gravelly Silty Coarse to Medium Sand (SP to SP-SM)			40			
	100				70			
	110				73			
95.2	120				55			
		Boring Terminated at 120.5 Feet						
	130							
	140							
	150							
	160							

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REVISED		DATE	
REVISED		DATE	
APPROVED		DATE	

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1515B-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
RICHTON DOME

BORING MRIG-220

TABLE NO. A-2.14
PAGE 2 OF 2

[redacted]

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UNDISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
262.6	0 10	Reddish Brown Sandy Silty Clay to Brown and Tan Mottled Clayey Silty Medium to Fine Sand (CL to SM)	CITRONELLE		15 26			Rotary Wash Boring
250.6	20 30	Greenish Gray, Brown, Tan, and Black Mottled Fine Sandy Silty Clay (CL)	HATTIESBURG		8 15 13 17 37			
226.6	40	Greenish Gray Fine Sandy Silty Clay to Greenish Gray Clayey Silty Fine Sand (CL to SM-SC)			44 67/8"			
214.6	50 60	Greenish Gray Fine Sandy Silty Clay (CL)			32 65 54			
198.6	70 80	Greenish Gray Silty Clayey Medium to Fine Sand (SM-SC)			73/11" 78/8" 100 100			

Location: Sec 26 T5N R10W
Perry County, Mississippi
Completed 10-24-79

PREPARED		DATE	
REVISED		DATE	
REVISED		DATE	
APPROVED		DATE	

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

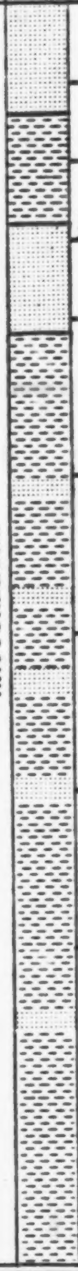
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1516A-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
RICHTON DOME
BORING MRIG-226

TABLE NO. A-2.15
PAGE 1 OF 2

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
	80	Greenish Gray Silty Clayey Medium to Fine Sand (SM-SC)	HATTIESBURG		65/9"			
175.6	90	Gray Fine Sandy Silty Clay (CL)			25			
168.6		Gray Silty Clayey Fine Sand (SM-SC)			100/5" 100			
161.6	100	Greenish Gray Medium to Fine Sandy Silty Clay Interbedded with Greenish Gray Silty Clayey Fine Sand (CL with SC)						
	110				81			
	120				100			
	130				69			
	140				100			
	150				67/8"			
102.1	160	Boring Terminated at 160.5 Ft			77			



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APPROVED ______ DATE ______

NATIONAL WASTE TERMINAL STORAGE PROGRAM
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LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1516B-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
RICHTON DOME
BORING MRIG-226

TABLE NO. A-2.15
PAGE 2 OF 2

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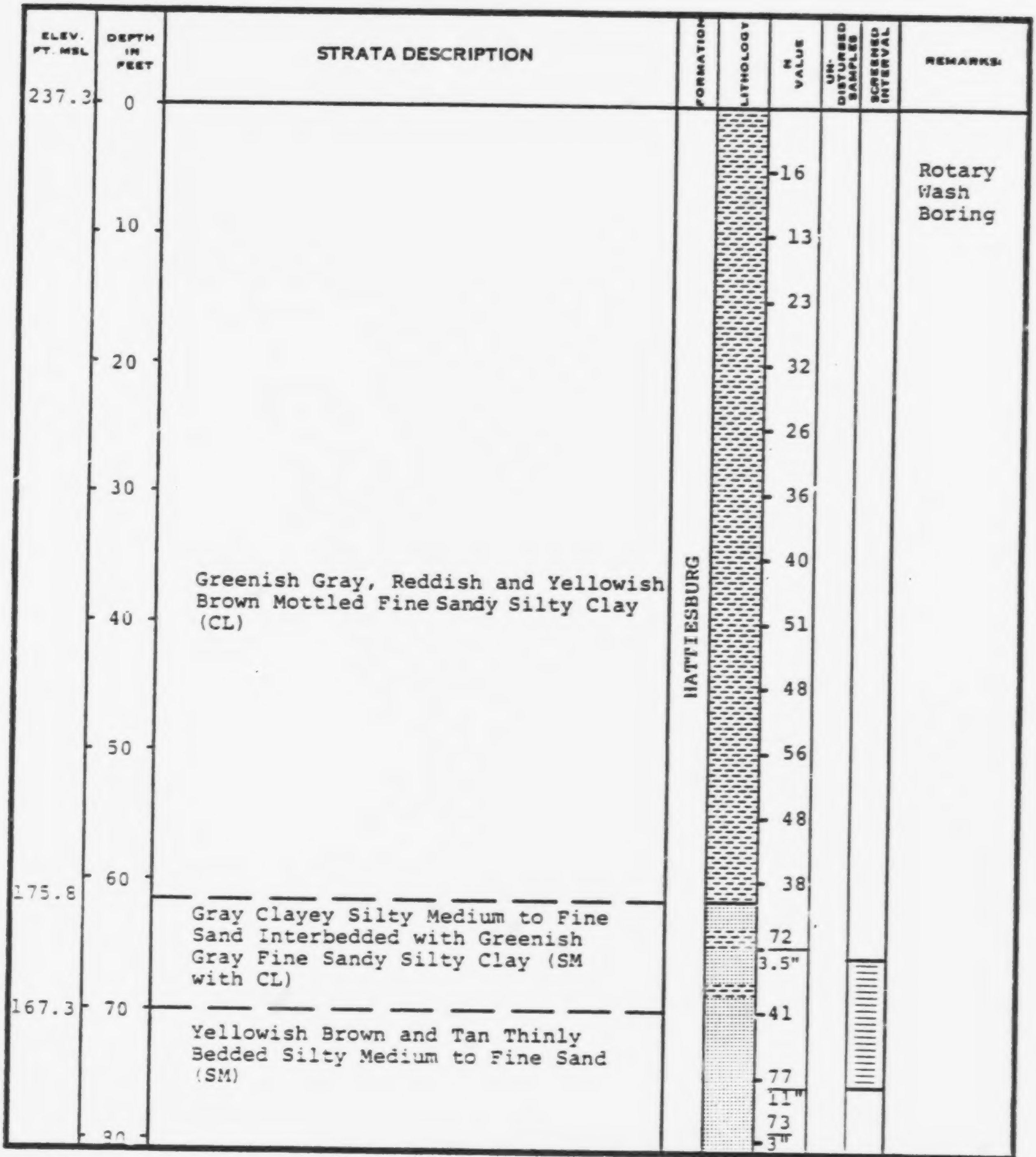
ELEV. FT. MSL
DEPTH IN FEET
STRATA DESCRIPTION
FORMATION
LITHOLOGY
N VALUE
UN-DISTURBED SAMPLES
SCREENED INTERVAL
REMARKS
237.3
0
10
20
30
40
50
60
175.8
167.3
70
HATTIESBURG
16
13
23
32
26
36
40
51
48
56
48
38
72
3.5"
41
77
11"
73
3"

Greenish Gray, Reddish and Yellowish Brown Mottled Fine Sandy Silty Clay (CL)

Gray Clayey Silty Medium to Fine Sand Interbedded with Greenish Gray Fine Sandy Silty Clay (SM with CL)

Yellowish Brown and Tan Thinly Bedded Silty Medium to Fine Sand (SM)

Rotary Wash Boring

Location: Sec 34 T5N R10W
Perry County, Mississippi
Completed 11-18-79

PREPARED ________ DATE ________
REVISED ________ DATE ________
REVISED ________ DATE ________
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NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1517A-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
RICHTON DOME

BORING MRIG-227

TABLE NO. A-2.16
PAGE 1 OF 2

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BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
	80	Yellowish Brown and Tan Thinly Bedded Silty Medium to Fine Sand (SM)	HATTIESBURG					
153.3		Greenish Gray Clayey Silty Fine Sand Interbedded with Greenish Gray Fine Sandy Silty Clay (SM with CL)			34			
					68			
	90							
					76			
					81/8.5			
	100							
					100/8.5"			
	110							
123.3		Greenish Gray and Brown Fine Sandy Silty Clay (CL)						
	120				94			
	130				52			
96.8	140				51			
		Boring Terminated at 140.5 Feet						
	150							
	160							

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
RICHTON DOME
BORING MRIG-227

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
APPROVED ________ DATE ______

JOB NO. MV9700 T-1517B-0

TABLE NO. A-2.16
PAGE 2 OF 2

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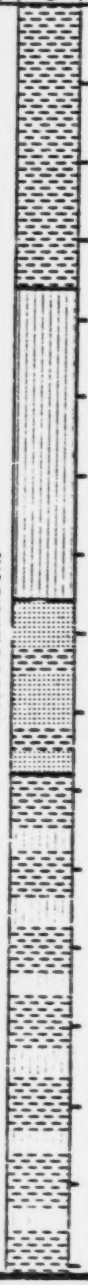
BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
185.1	0 10	Grayish Tan, Red and Orange Mottled Fine Sandy Silty Clay (CL)	HATTIESBURG		17 19 25			Rotary Wash Boring
167.1	20 30	Greenish Gray to Yellowish Brown Mottled Fine Sandy Clayey Silt (ML)			27 37 59 69			
147.1	40	Greenish Gray Silty Fine Sand with Interbedded Green Gray Silty Clay (SM and CL)			96 67			
136.1	50 60 70 80	Greenish Gray Interbedded Silty Clay and Clayey Silt (CL and ML)			52 60 33 39 52 47 31			

Location: Sec 33 T5N R10W
Perry County, Mississippi
Completed 10-6-79

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REVISED ____________ DATE ________
REVISED ____________ DATE ________
APPROVED ____________ DATE ________

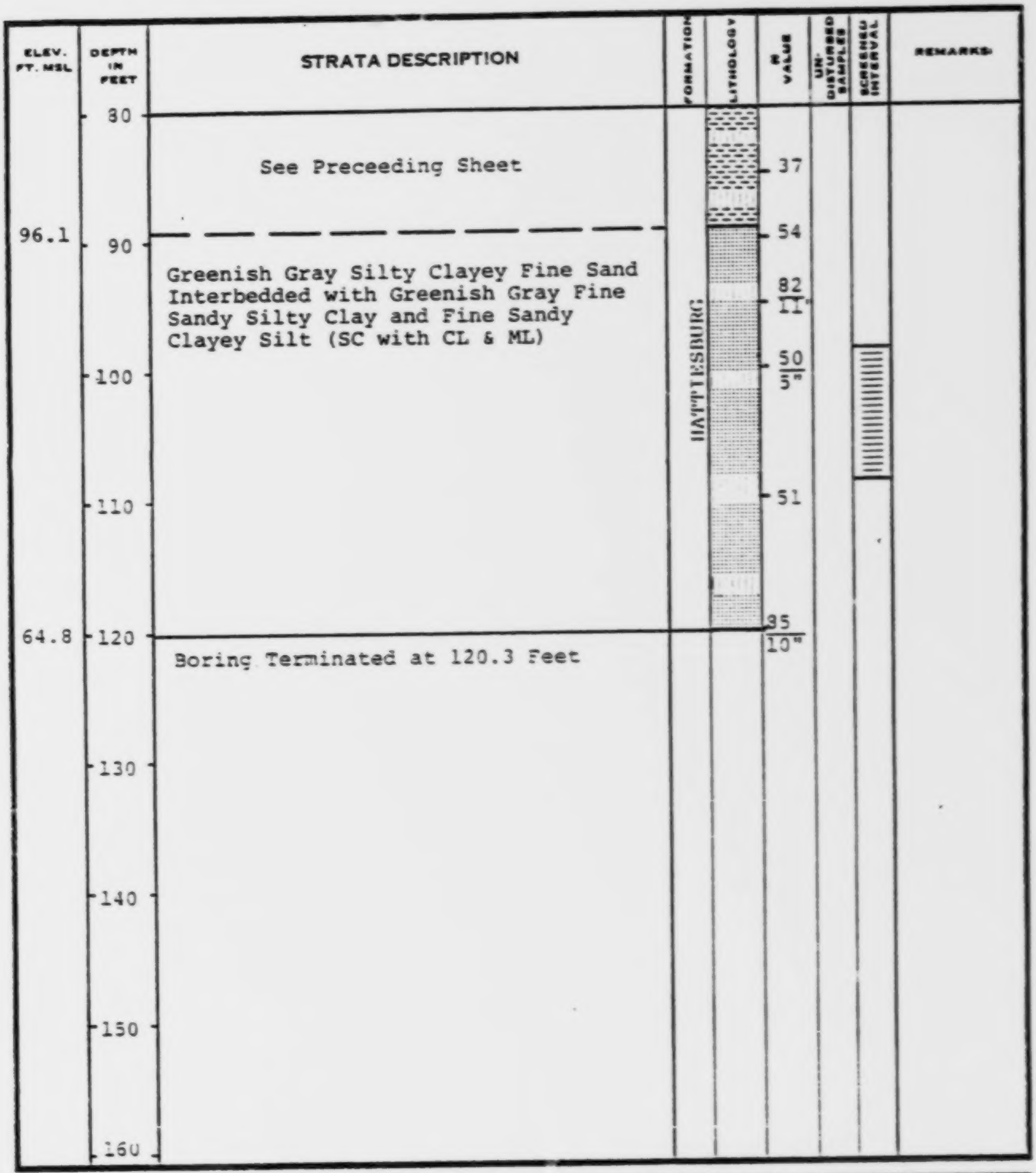
NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1518A-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
RICHTON DOME
BORING MRIG-228

TABLE NO. A-2.17
PAGE 1 OF 2



ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	80	See Preceeding Sheet		37			
96.1	90	Greenish Gray Silty Clayey Fine Sand Interbedded with Greenish Gray Fine Sandy Silty Clay and Fine Sandy Clayey Silt (SC with CL & ML)	HATTIESBURG	54 82/11" 50/5" 51 35/10"			
	100						
	110						
64.8	120	Boring Terminated at 120.3 Feet					
	130						
	140						
	150						
	160						

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REVISED ________ DATE ________
APPROVED ________ DATE ________

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1518B-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
RICHTON DOME

BORING MRIG-228

TABLE NO. A-2.17
PAGE 2 OF 2

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ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
257.8	0 10 20 30	Reddish and Yellowish Brown and Gray Mottled Fine Sandy Silty Clay (CL)	CITRONELLE	▨	10 14 15 14 15 15 31			Rotary Wash Boring
221.8	40 50 60 70 80	Tan, Yellowish and Reddish Brown Mottled Silty Coarse to Fine Sand (SM)		░	75/11" 43 56 80/10" 43 55 75/10" 38 91/11"			

Location: Sec 34 T5N R10W
Perry County, Mississippi
Completed 12-3-79

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REVISED ________	DATE ________
REVISED ________	DATE ________
APPROVED ________	DATE ________

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1519A-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
RICHTON DOME

BORING MRIG-230

TABLE NO. A-2.18
PAGE 1 OF 2

BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	80	See Preceeding Sheet						
173.8		Yellowish and Reddish Brown to Tan Mottled Gravelly Silty Coarse to Fine Sand (SM)	CITRONELLE		74/7"			
	90				81/10.5" 74/10"			
	100				100/11.5"			
	110				71/10"			
	120				100		▤	
	130				100		▤	
119.0	140	Gray Silty Clay Interbedded with Tan and Yellowish Brown Mottled Silty Clayey Medium to Fine Sand (CL with SC)	HATTIESBURG		38			
	150	Greenish Gray Fine Sandy Silty Clay Interbedded with Gray Silty Fine Sand (CL with SM)			46			
98.3	160	Boring Terminated at 159.5 Feet			100/6.5"			

PREPARED ______ DATE ______ REVISED ______ DATE ______ REVISED ______ DATE ______ APPROVED ______ DATE ______	NATIONAL WASTE TERMINAL STORAGE PROGRAM GEOLOGIC EVALUATION GULF COAST SALT DOMES LAW ENGINEERING TESTING COMPANY MARIETTA GEORGIA JOB NO. MV9700 T-1519B-0	SHALLOW BORING RECORD MISSISSIPPI STUDY AREA RICHTON DOME BORING MRIG-230 TABLE NO. A-2.18 PAGE 2 OF 2

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
230.5	0 10	Tan Brown Clayey Silty Medium to Fine Sand (SM)	CITRONELLE		8 25			Rotary Wash Boring
218.0		Gray Fine Sandy Silty Clay (CL)			14			
213.0	20	Gray Silty Clayey Fine Sand (SC)			16			
208.0	30 40 50	Gray to Tan Fine Sandy Silty Clay (CL)			15 27 23 22 22 20			
176.5	60	Tan, Gray, Red, and Brown Laminated Silty Medium to Fine Sand (SP-SM)			58 55 71			
163.5	70 80	Gray and Brown Slightly Silty Clay Interbedded with Slightly Sandy Clayey Silt (CL with ML)			33 44 42			

Location: Sec 3 T4N R10W
Perry County, Mississippi
Completed 3-19-80

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
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JOB NO. MV9700 T-1520A-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
RICHTON DOME
BORING MRIG-305

TABLE NO. A-2.19
PAGE 1 OF 3

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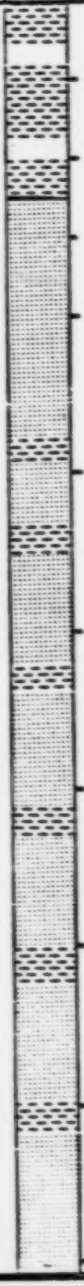
ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	80 90	Gray and Brown Slightly Silty Clay Interbedded with Slightly Sandy Clayey Silt (CL with ML)	CITRONELLE		59 50			
138.0	100	Tan and Dark Brown Mottled Fine Sand (SP)			46 59			
125.5	110 120 130 140 150 160	Tan, Tannish Orange, and Tannish Brown Silty Medium to Fine Sand Interbedded with Gray Clay (SM and CL)			75 90 100/7.5" 65 100/10" 90			



	NATIONAL WASTE TERMINAL STORAGE PROGRAM GEOLOGIC EVALUATION GULF COAST SALT DOMES LAW ENGINEERING TESTING COMPANY MARIETTA GEORGIA	SHALLOW BORING RECORD MISSISSIPPI STUDY AREA RICHTON DOME BORING MRIG-305
PREPARED ______ DATE ______ REVISED ______ DATE ______ REVISED ______ DATE ______ APPROVED ______ DATE ______	JOB NO. MV9700 T-1520B-0	TABLE NO. A-2.19 PAGE 2 OF 3

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ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	160	Tan, Tannish Orange, and Tannish Brown Silty Medium to Fine Sand Interbedded with Gray Clay (SM and CL)	CITRONELLE					
	170				100/7"			
	180				18			
	190				100/9.5"			
35.5		Greenish Gray Fine Sandy Silty Clay (CL)	HATTIESBURG					
	200				38			
25.5		Green Gray Silty Clayey Fine Sand (SC)						
20.0	210	End of Split Spoon Sampling Interval			93			
	220							
	230							
	240							

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REVISED ________ DATE ________
REVISED ________ DATE ________
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NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1520C-0

SHALLOW BORING RECORD
MISSISSIPPI STUDY AREA
RICHTON DOME

BORING MRIG-305

TABLE NO. A-2.19
PAGE 3 OF 3

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MISSISSIPPI STUDY AREA

APPENDIX A-3

NEAR-DOME WELL DATA

A tabulation of the hydrocarbon wells, mineral exploration wells, and Area Characterization wells within an 8-km (5-mi) radius of Cypress Creek, Lampton, and Richton Domes is presented in Tables A-3.1, A-3.2, and A-3.3, respectively, and the locations of these wells are shown in Figures A-3.1, A-3.2, and A-3.3. Data for wells within the -914-meter (-3,000 ft) MSL salt contours of the three domes are presented in Table 12-2, and the well locations are shown in Figures 13-3, 13-25, and 13-39 of Volume VI.

Geophysical log data and Mississippi State Oil and Gas Board records were used to determine well locations. Information concerning the total depth of the wells, stratigraphic horizons at termination and logged intervals was obtained from the geophysical logs, scout cards, and Mississippi State Oil and Gas Board completion reports.

MISSISSIPPI STUDY AREA

APPENDIX A-3

TABLE A-3.1 (Page 1 of 1)

HYDROCARBON WELLS WITHIN A 5-MILE* RADIUS OF CYPRESS CREEK DOME**

LETCo Well Number	Well Name	Total Depth (ft.)***	Formation/Group at Termination	Logged Interval (ft.)
P-14	COURSON Newman Lumber #2	3027	No Data	--
P-20	PHILLIPS Newman #1	8437	Midway	1591-8437
P-21	SHELL USA 26-11	14459	Dantzler	54-14470
	DOE USA MCCG-2	3006	Tallahatta	0-3006
	DOE USA MCCH-3B†	4100	Wilcox	0-4100

*To convert to kilometers, multiply by 1.609.
**Location of wells shown in Figure A-3-1.
***To convert to meters, multiply by 0.3048.
†Deepest Area Characterization well at multiple hole site.

MISSISSIPPI STUDY AREA

APPENDIX A-3

TABLE A-3.2 (Page 1 of 1)

HYDROCARBON AND MINERAL EXPLORATION WELLS WITHIN A 5-MILE* RADIUS OF LAMPTON DOME**

LETCo Well Number	Well Name	Total Depth (ft.)***	Formation/Group at Termination	Logged Interval (ft.)
L-25	UNION Bradshaw #1	10663	Dantzler	63-8538
M-27	EXPLORO Cook #1	3000	Wilcox	115-2995
M-30	GULF Bradshaw #4	7200	Midway	30-5673
M-31	PELICAN Pinelands #1	2606	No Data	--
M-32	GULF Bradshaw #2	9241	L. Tuscaloosa	1025-9235
M-33	GULF Bradshaw #5	6828	L. Tuscaloosa	2385-6754
M-35	GULF Bradshaw #3	9622	M. Tuscaloosa	32-1797
M-36	LYLE CASHION Bradshaw #1	9510	L. Tuscaloosa	1125-9503
M-51	PARKER Simmons #1	10007	L. Tuscaloosa	80-10007
M-52	HUMBLE M.C. Norman #1	13513	Mooringsport	2143-13512
M-62	HUMBLE Brinson #1A	2240	Cockfield	50-2240
	DOE MASONITE MH-8A†	3700	Wilcox	0-3700

*To convert to kilometers, multiply by 1.609.

**Location of wells shown in Figure A-3-1.

***To convert to meters, multiply by 0.3048.

†Deepest Area Characterization well at multiple hole site.

MISSISSIPPI STUDY AREA

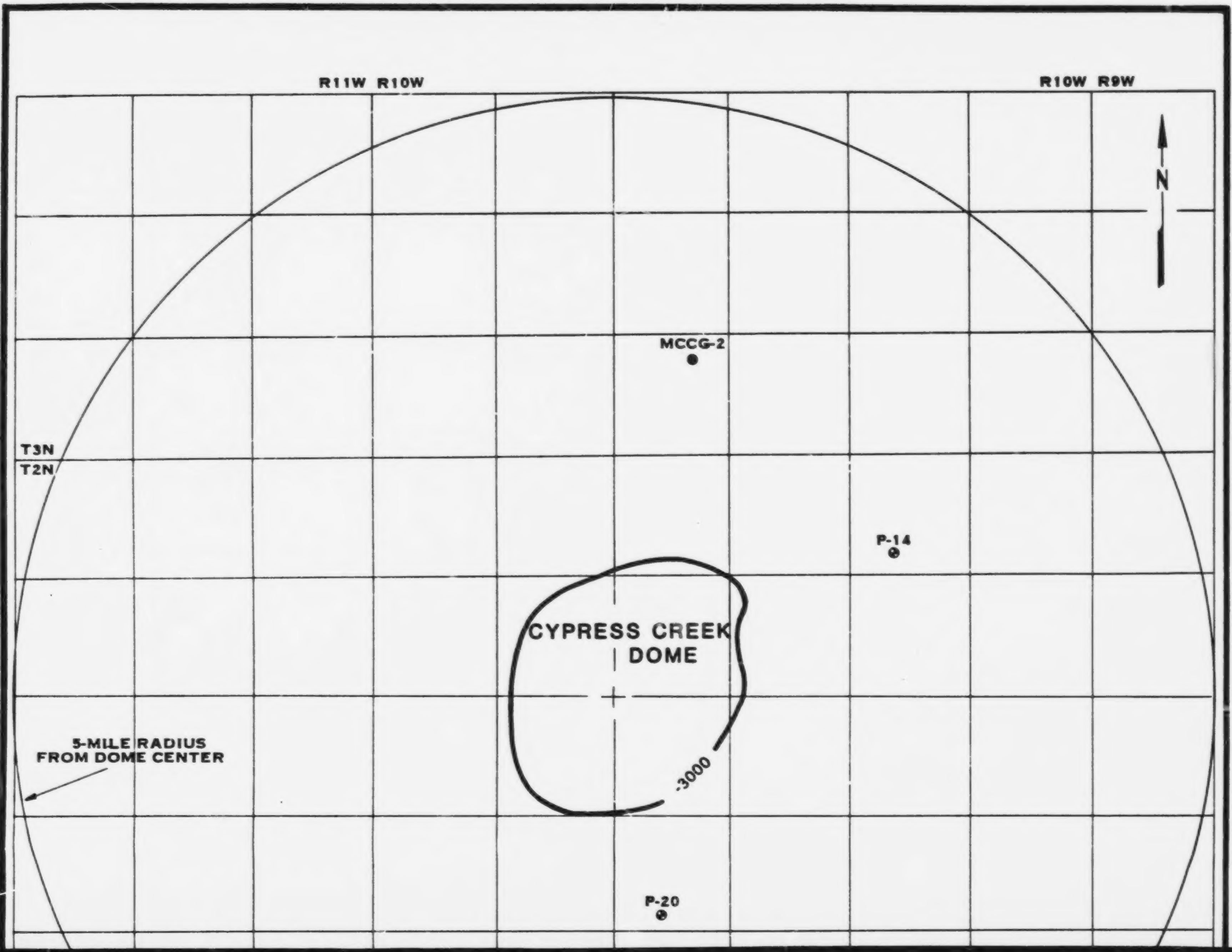
APPENDIX A-3

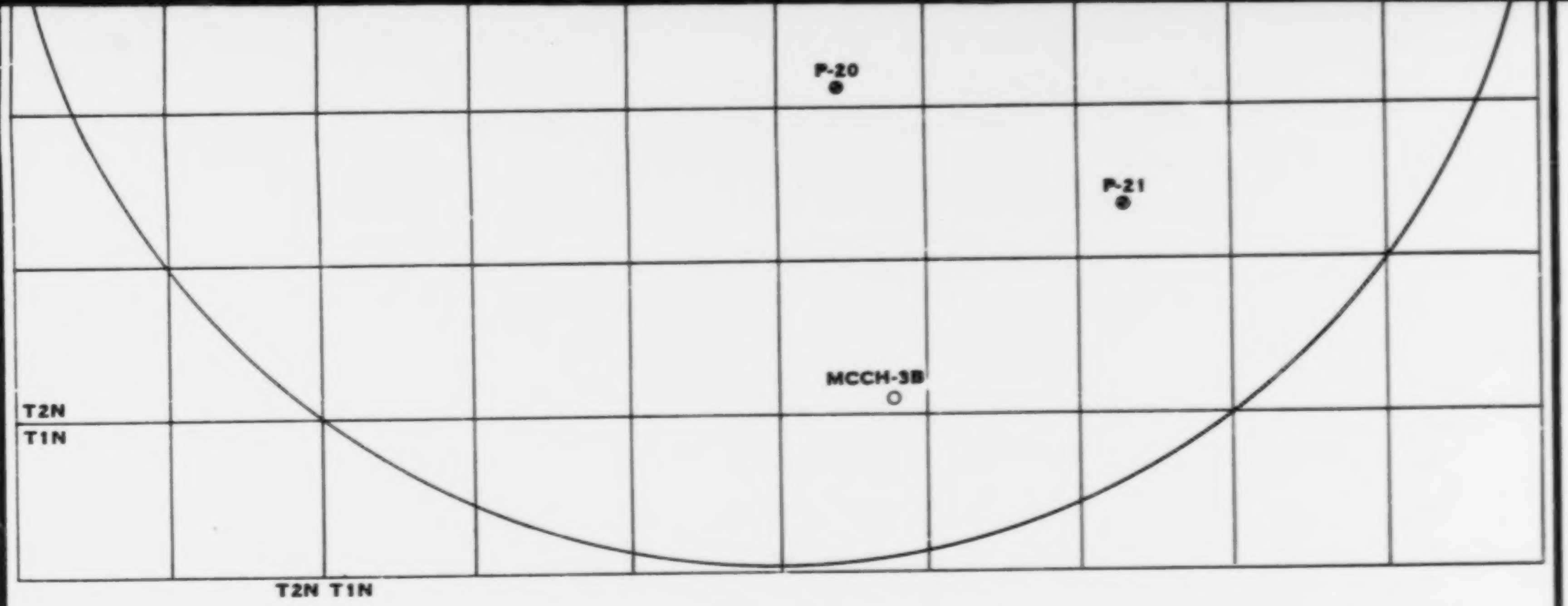
TABLE A-3.3 (Page 1 of 1)

HYDROCARBON AND MINERAL EXPLORATION WELLS WITHIN A 5-MILE* RADIUS OF RICHTON DOME**

LETCo Well Number	Well Name	Total Depth (ft.)***	Formation/Group at Termination	Logged Interval (ft.)
P-48	EXPLORO Carey #1	2000	Cook Mountain	137-1997
P-62	UNION McLaurin 4-13	15030	Hosston	6909-15033
P-63	UNION Masonite #1	14996	Anhydrite sheath	5990-14921
P-64	UNION Masonite #1	14531	Salt	5885-14534
P-65	SHELL Masonite #1	12969	Salt	1502-12918
P-66	SHELL Masonite #21-1	14497	Salt	2405-14499
P-75	SHELL Masonite #23-7	14930	Anhydrite sheath	3944-14930
P-85	GULF Stevens #1	8874	Dantzler	60-8873
P-86	DONALD Donald #1	3100	No Data	--
P-89	MINSEARCH Ridgeway B-9	2601	No Data	--
P-100	PAN AMERICAN Powe #1	2325	Hosston	No Data
P-101	PAN AMERICAN Powe #1-A	14199	Hosston	2474-14145
P-102	HUMBLE Revet #1-A	2401	Wilcox	50-2401
P-104	UNION Masonite #1	15306	Hosston	6005-15274
	DOE Masonite MRIG-10[†]	2699	Wilcox	0-2699
	DOE Smith MRIH-11A[†]	6041	Selma	0-6041

*To convert to kilometers, multiply by 1.609.
**Location of wells shown in Figure A-3-1.
***To convert to meters, multiply by 0.3048.
[†] Deepest Area Characterization well at multiple hole site.


R11W R10W
R10W R9W
N
MCCG-2
T3N
T2N
P-14
CYPRESS CREEK DOME
-3000
5-MILE RADIUS FROM DOME CENTER
P-20

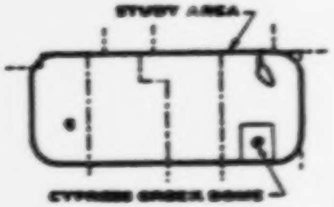

P-20
P-21
MCCH-3B
T2N
T1N
T2N T1N

LEGEND

●	OIL OR GAS WELL
○	AREA CHARACTERIZATION HYDROLOGIC BORING
●	AREA CHARACTERIZATION GEOLOGIC BORING
—-3000—	INTERPRETED SALT CONTOUR ELEVATION FEET MSL

NOTE

WELLS WITHIN THE -3000 FOOT MSL SALT
CONTOUR ARE SHOWN ON FIGURE 13-3 IN VOLUME II B


STUDY AREA
CYPRESS CREEK DOME

1
0
1 MILES
1
0
1
KILOMETERS

82A

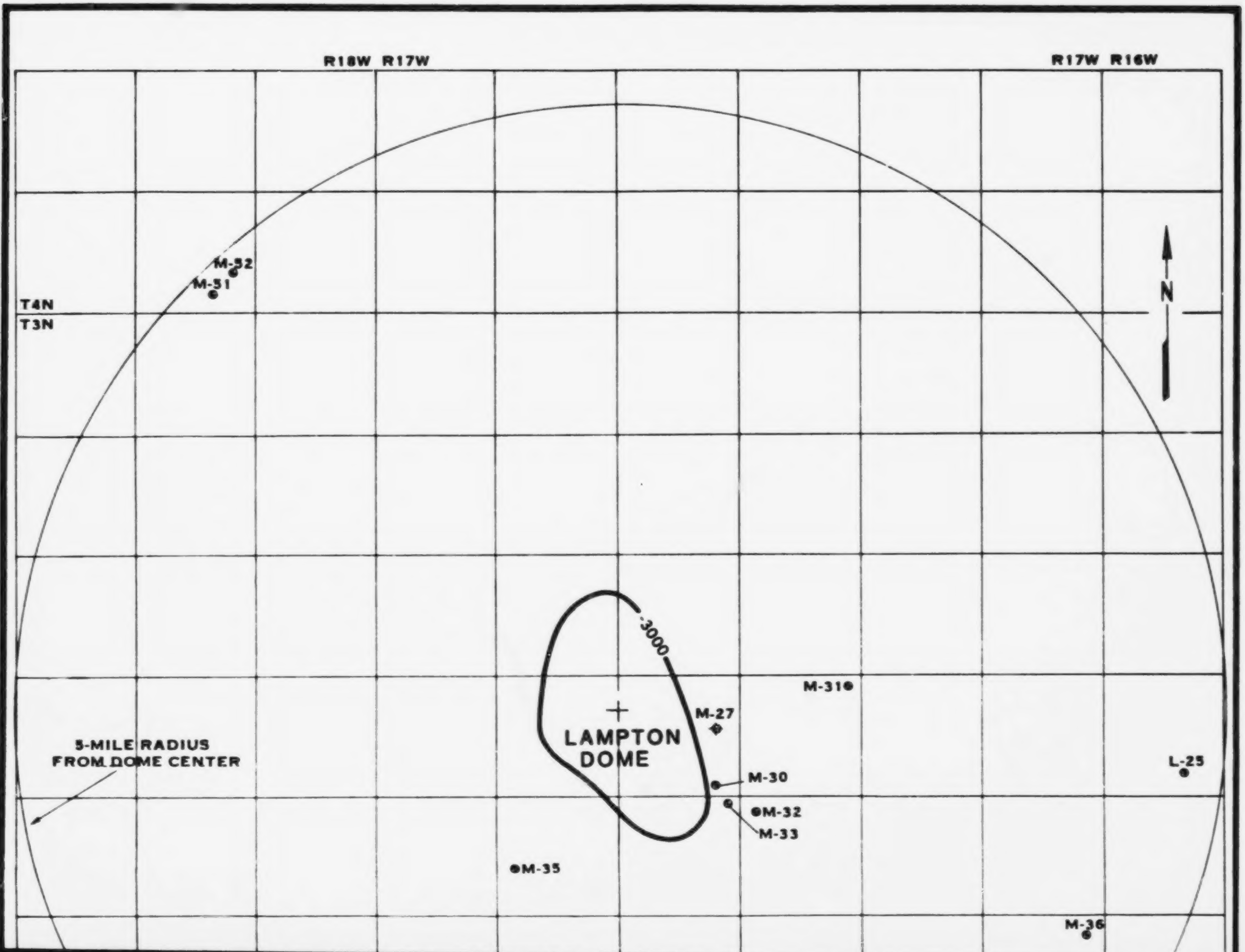
PREPARED J.D.G. DATE 12/22/80
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED GHF DATE 12/22/80
T-1611-0

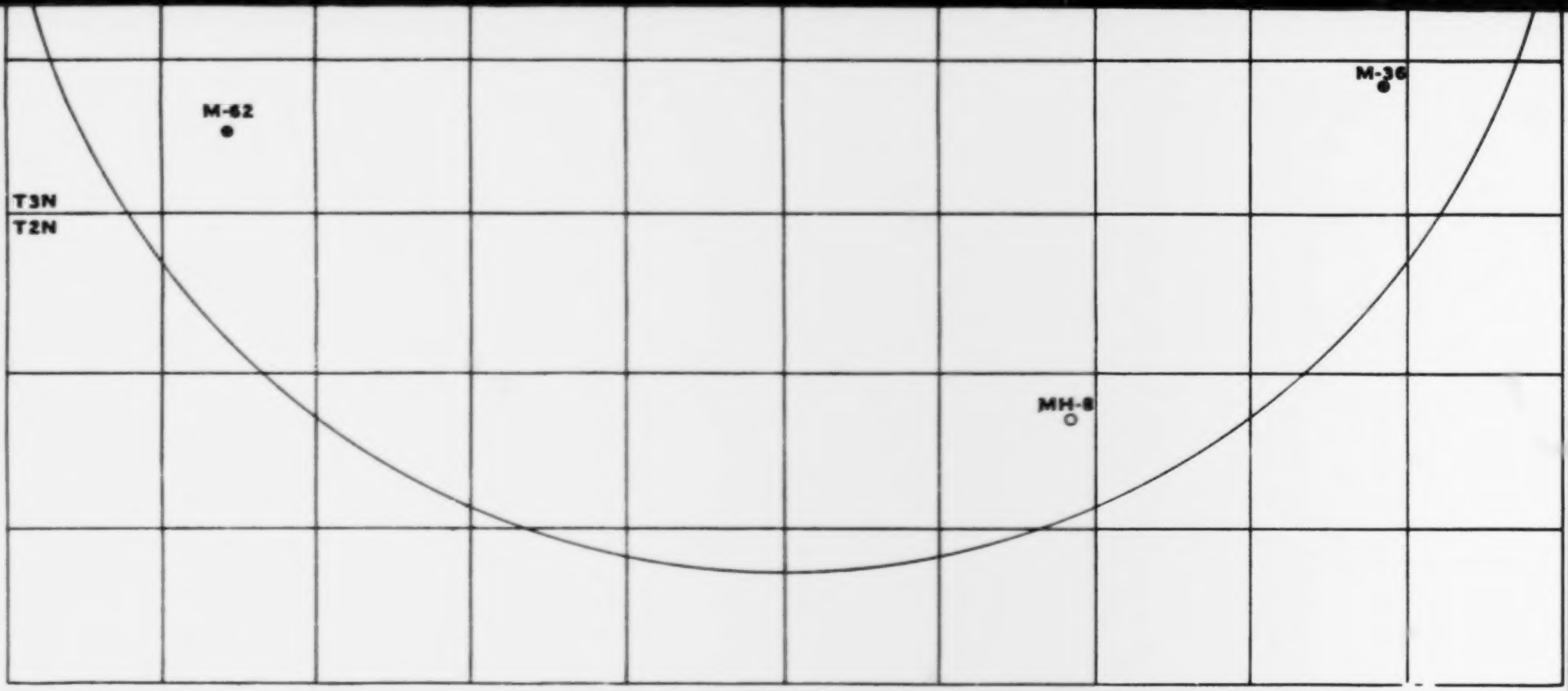
NATIONAL WASTE TERMINAL
STORAGE PROGRAM
GEOLOGIC EVALUATION GULF
COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX A-3
LOCATION MAP OF WELLS WITHIN
5-MILE RADIUS OF CYPRESS CREEK DOME
JOB NO. MV9700
FIGURE A-3.1

FIGURE A-3.1

BEST DOCUMENT AVAILABLE


R18W R17W
R17W R16W
T4N
T3N
N
M-52
M-51
-3000
LAMPTON DOME
M-27
M-31
L-25
M-30
M-32
M-33
M-35
M-36
5-MILE RADIUS FROM DOME CENTER


M-62
M-36
T3N
T2N
MH-8

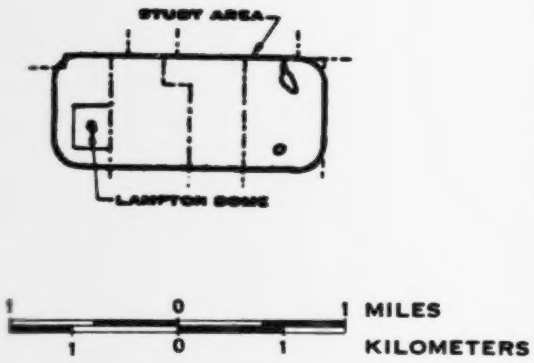
83A

LEGEND

●	OIL OR GAS WELL
◇	SULPHUR TEST WELL
○	AREA CHARACTERIZATION HYDROLOGIC BORING
—— -3000 ——	INTERPRETED SALT CONTOUR - ELEVATION FEET MSL

NOTE

WELLS WITHIN THE -3000 FOOT MSL SALT CONTOUR
ARE SHOWN ON FIGURE 13-28 IN VOLUME IV B


STUDY AREA
LAMPTON DOME
1
0
1
MILES
1
0
1
KILOMETERS

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PREPARED	J.D.G.	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GHF	DATE	12/22/80

T-1619-0

NATIONAL WASTE TERMINAL
STORAGE PROGRAM
GEOLOGIC EVALUATION GULF
COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

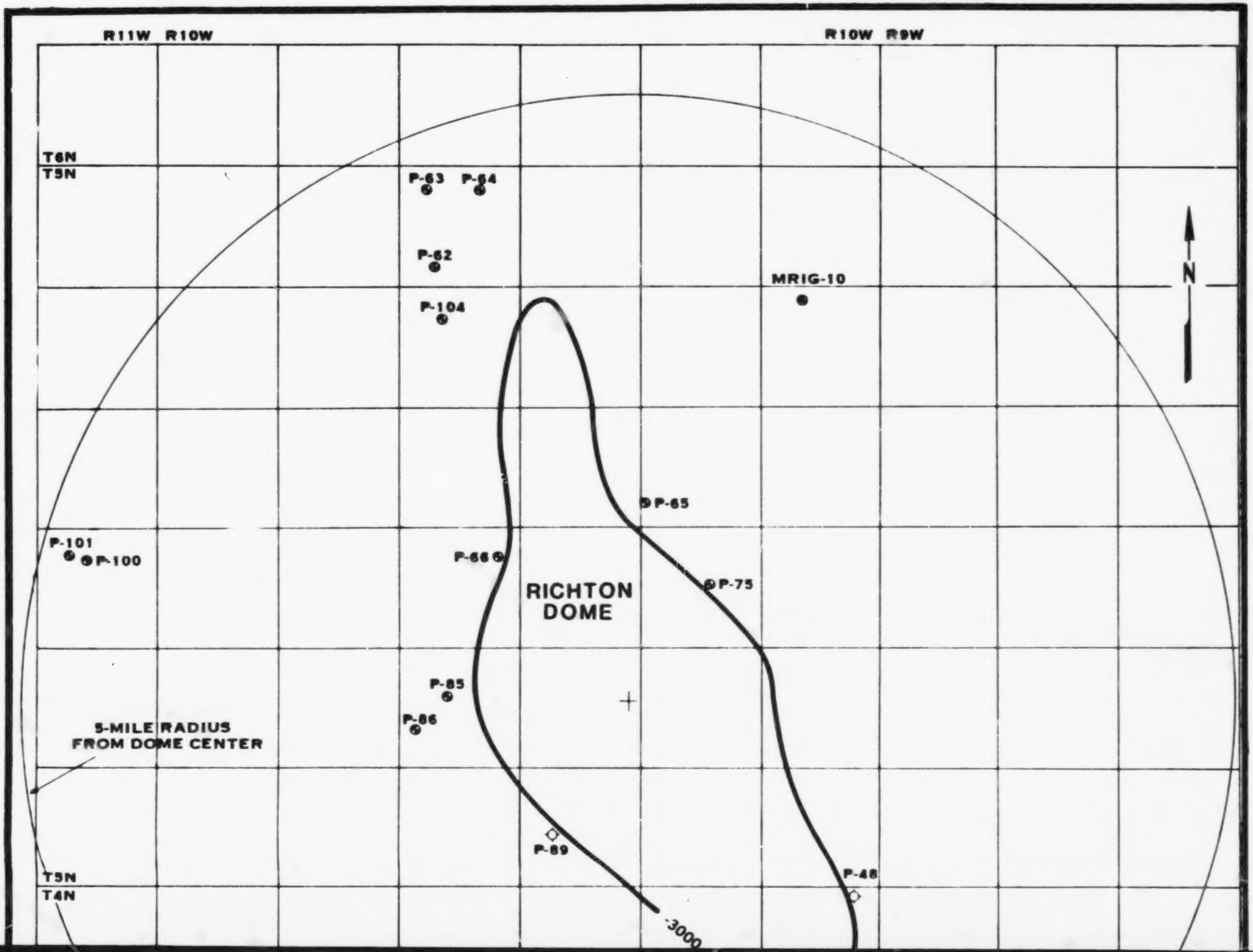
MISSISSIPPI STUDY AREA
APPENDIX A-3
LOCATION MAP OF WELLS WITHIN
5-MILE RADIUS OF LAMPTON DOME

JOB NO. MV9700

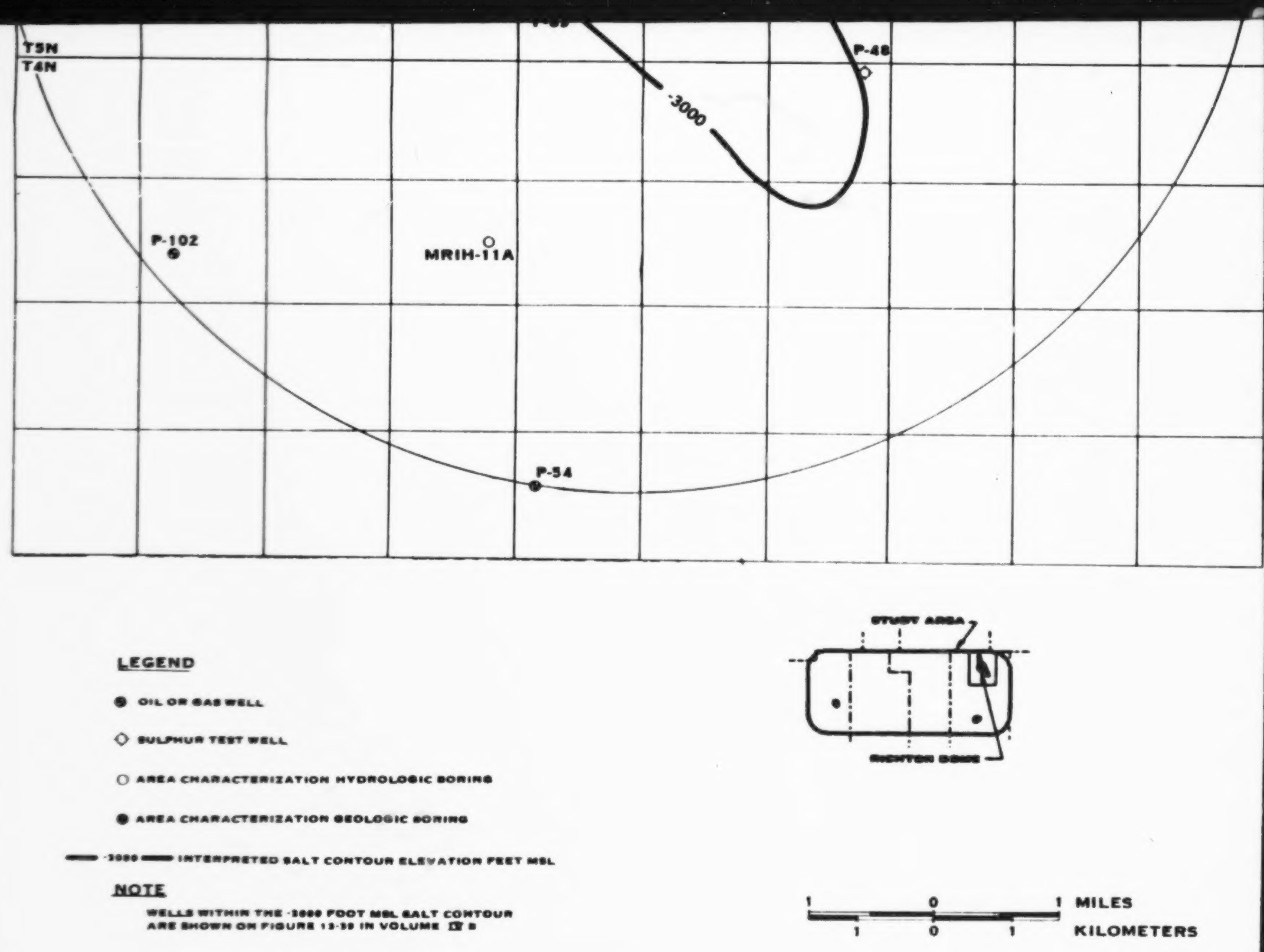
FIGURE A-3.2

FIGURE A-3.2

84


R11W R10W
R10W R9W
T6N
T5N
P-63
P-64
P-62
P-104
MRIG-10
N
P-65
P-101
P-100
P-66
P-75
RICHTON
DOME
P-85
P-86
5-MILE RADIUS
FROM DOME CENTER
P-89
T5N
T4N
P-48
-3000

84A


T5N
T4N
P-48
-3000
P-102
MRIH-11A
P-54
STUDY AREA
RICHTON DOME
LEGEND
● OIL OR GAS WELL
◇ SULPHUR TEST WELL
○ AREA CHARACTERIZATION HYDROLOGIC BORING
● AREA CHARACTERIZATION GEOLOGIC BORING
-3000 INTERPRETED SALT CONTOUR ELEVATION FEET MSL
NOTE
WELLS WITHIN THE -3000 FOOT MSL SALT CONTOUR ARE SHOWN ON FIGURE 13-30 IN VOLUME IV B
1 0 1 MILES
1 0 1 KILOMETERS

PREPARED J.D.G.	DATE 12/22/80
REVISED	DATE
REVISED	DATE
APPROVED GHF	DATE 12/22/80

T-1620-0

NATIONAL WASTE TERMINAL
STORAGE PROGRAM
GEOLOGIC EVALUATION GULF
COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA

APPENDIX A-3

LOCATION MAP OF WELLS WITHIN
5-MILE RADIUS OF RICHTON DOME

JOB NO. MV9700

FIGURE A-3.3

FIGURE A-3.3

MISSISSIPPI STUDY AREA

APPENDIX A-4

STUDY AREA WELL DATA

Well data from previously drilled wells and Area Characterization wells were used to determine the tops of the geologic units within the study area. These data were used to construct structural contour and isopachous maps for structural and stratigraphic analyses of the study area.

The locations of the wells used in analyses are shown in Figure A-4.1. A tabulation of the hydrocarbon wells (dry and productive), mineral exploration wells, and Area Characterization wells which were utilized in these studies is presented in Table A-4.1.

Geophysical log data and Mississippi State Oil and Gas Board records were used to determine the well locations. Information concerning the total depth of the wells, stratigraphic horizons at termination, and logged intervals was obtained from geophysical logs, scout cards, and Mississippi State Oil and Gas Board completion reports.

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MISSISSIPPI STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 1 of 12)

WELLS USED IN ANALYSES†

LETCO Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
C-1	SINCLAIR Miller-Aultman #1	15276	Hosston	532-15276
C-1A	S. LOUISIANA Aultman #1	16492	Hosston	3034-16492
C-4	FREEPORT Beasley #1	1624	Salt	357-1624
C-5	FREEPORT Scarsborough #1	1910	Salt	221-1910
C-6	FREEPORT Watts #1	1718	Salt	350-1718
C-7	ENSEARCH Fairchild #1	16004	Hosston	3090-16001
F-4	SEABOARD Chancellor #1	12518	Paluxy	80-12513
F-5	SEABOARD Alexander #1	9019	Dantzler	86-9019
F-6	LARUE Batson #1	9015	L. Tuscaloosa	964-9015
F-7	CHEVRON USA #1	11513	Paluxy	71-11511
F-8	COMO Newton #1	10021	Wash.-Fred.	1164-10016
F-9	PRUETT USA #1	9006	L. Tuscaloosa	962-8985
F-10	LARCO Smith #1	9009	L. Tuscaloosa	962-9009
F-11	SKELLY Love #1	1939	Salt	1757-1927
F-12	NEILSON ET AL Anderson #1	9062	Dantzler	2032-9062
F-13	TROTTER Powe #1	9123	Dantzler	982-9117
F-14	CITIES SERVICE Myers #1	12728	Paluxy	2045-12727
F-15	JETT Carter #1	13405	Mooringsport	1778-13400
F-16	JETT Southern Carter #1	8986	Dantzler	1044-8979
F-17	SOUTHERN Carter #1	12100	Paluxy	No Data
F-18	MOBIL USA ES2531	14000	Mooringsport	104-13999
F-19	SUPERIOR Bradford #1	15677	Hosston	1288-15674
F-20	SUPERIOR Draughn #1	12139	Paluxy	1277-12139
F-21	TEXAS Gilliam #1	11305	Wash.-Fred.	50-11305
F-22	HUMBLE Griffin #1	9418	Dantzler	76-9418
F-23	CALIFORNIA Berry #1	6028	Salt	1826-6011
F-24	EVANS Batten #1	7805	Dantzler	1805-7805
F-25	LARCO GAMILL Aultman #1	12819	Paluxy	1866-12818
F-26	SHELL Tatum #1	16035	Hosston	60-16031
F-27	DUCK-HUGHES Herchennahn #1	9005	Dantzler	40-9005

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MISSISSIPPI STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 2 of 12)

WELLS USED IN ANALYSES

LETCO Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
F-28	ALLIED Fee #1	3111	Wilcox	268-3107
F-29	HUMBLE Harrison #1	14006	Rodessa	150-14002
F-30	SUPERIOR Largham #1	9501	Dantzler	1399-9501
F-31	KIRBY-MOOSBAKER Bd. of Supr.#1	9270	Dantzler	916-9264
F-32	CROW-HAMILTON Geosote #1	9107	L. Tuscaloosa	910-9107
F-33	AMERICAN LIBERTY LARUE USA #1	8720	L. Tuscaloosa	853-8718
F-34	LYLE CASHION USA #K-1	9512	Dantzler	1070-9506
F-35	BEARD Pine Hills #1	8800	L. Tuscaloosa	900-8806
F-36	DANCIGER Love #1	1960	Salt	320-1960
F-37	HUMBLE Carter #1A	2000	No Data	100-1250
F-38	HUMBLE Thompson #1A	1641	Cockfield	100-1641
F-39	HUMBLE Fillingune #1A	1926	Cockfield	60-1926
F-40	HUMBLE Barron #1A	1584	Cockfield	60-1584
F-41	HUMBLE McMichael #1A	1496	Cockfield	0-1496
F-42	HUMBLE Roddin #1A	1640	Cockfield	55-1640
F-43	PELTO & HEWITT Boyce #1	16021	Hosston	5590-16015
F-44	ENTERPRISE Disposal Well #2	4974	Wilcox	401-4974
F-45	AMERICAN QUASAR #1 Power 6-7	16425	Hosston	3101-16423
F-46	HUNT & WHITAKER USDA #1A	9310	L. Tuscaloosa	858--9310
F-47	HUNT & FORREST Lee #1	16120	Hosston	70-16113
F-48	COQUINA & FOREST Sabine #1	16830	No Data	14300-16830 (Density Log)
G-1	GENERAL Green #1	9011	Dantzler	975-9010
G-1A	SOUTHERN McKay #1	10600	Paluxy	No Data
G-2	KING Neely-Jackson #1	13530	Mooringsport	1420-13524
G-2A	AMERICAN QUASAR & CONWOOD #1 Pipkin 12-6	16990	Hosston	5650-16984
G-3	CITIES SERVICE Robinson Land Co. #1	13060	Hosston	2201-13059
G-3A	E. V. CLEVELAND Hubbard #1A	8006	L. Tuscaloosa	774-8004
G-3B	CITIES SERVICE Robinson #2	12315	No Data	1990-12315 (Sonic Log)

MISSISSIPPI STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 3 of 12)

WELLS USED IN ANALYSES

LETCO Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
G-4	LARCO & GAMMILL Reasor #1	12522	Paluxy	2152-12502
G-5	MCGLOTHLIN-MOON-WILLIAMS Ware #1	8874	L. Tuscaloosa	538-8858
G-7	HUMBLE Huret #1	12328	Hosston	36-12328
G-8	TRIAD Franklin #2	12298	Hosston	1644-12298
G-9	HUMBLE Bowen #1	8268	L. Tuscaloosa	100-8268
G-10	CITIES SERVICE Reasor #1	13691	Hosston	88-13691
G-11	CITIES SERVICE Bd. of Supr. B-1	11015	Paluxy	1986-11014
G-12	TRIAD Franklin #1	12522	Rodessa-Hosston	1832-12521
G-13	TRIAD Hubbard #1	10529	Paluxy	1337-10528
G-14	MCGLOTHLIN-MOON-GULF COAST Jones #1	8238	Dantzler	594-8278
G-15	HUMBLE Henderson #1	9257	Wash.-Fred.	40-9257
G-16	HUMBLE Brewer #1A	1422	Cook Mountain	50-1420
G-17	GRACE Kirby 4-8 #1	6945	Eutaw	602-6943
JD-1	FLORIDA #1 Unit 9-7	16598	Hosston	3083-16592
JD-2	GULF COAST Hathorn #1	10008	L. Tuscaloosa	2481-10002
JD-3	HUMBLE Burkett #1	11122	Wash.-Fred.	90-11122
JD-4	GRELLING Dyess #1	10018	L. Tuscaloosa	1200-10018
JD-6	1ST MISS. ET AL Hathorn #1	16982	Hosston	83-16976
JD-7	SUN OIL Dyess #1	14013	Mooringsport	2305-14012
JD-8	SYSTEM #1 Stringer 24-11	16808	Hosston	3282-16806
JD-9	1ST ENERGY Hatton #1	16463	Hosston	3074-16457
JD-10	1ST MISS. ET AL Diffrient #A	16486	Hosston	7189-16480
JD-11	1ST MISS. ET AL Diffrient #1	16969	Hosston	3080-16963
J-1	GULF COAST ET AL USA #1	9020	Dantzler	989-9007
J-2	UNION Moore & Dennis #1	15260	Hosston	No Data
J-3	UNION Dennis #1	14437	Hosston	6023-14435
J-4	UNION USA #1	14644	Hosston	3070-14638
J-5	HUMBLE Fox #1	9001	Dantzler	75-9001
J-6	HUMBLE Murphy #1	8605	L. Tuscaloosa	106-8605

MISSISSIPPI STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 4 of 12)

WELLS USED IN ANALYSES

LETCO Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
J-7	GINTHER Mitchell #1	8762	L. Tuscaloosa	105-8762
J-8	CITIES SERVICE Wall #1	10098	Dantzler	2506-10097
J-12	MERRIL INVESTMENT Arrington #1	12698	Paluxy	1883-12697
J-13	GINTHER-SUNSET Shows #4	12987	Rodessa	2077-12986
L-1	BIGLANE Batson #1	10047	Wash.-Fred.	1182-9822
L-2	CENTRAL OIL Bass Pecan #1	9259	L. Tuscaloosa	818-9257
L-3	CRUSADER-JETT Phoenix Minerals #1	9509	L. Tuscaloosa	992-9503
L-4	ROESER & PENDLETON Batson #6	8810	L. Tuscaloosa	1477-8810
L-5	LEWIS & ROSEBERRY Voss #1	9010	L. Tuscaloosa	1135-9010
L-6	PIONEER Fowler #1	10715	Wash.-Fred.	1434-10715
L-7	MOLERO-GHOLSON Rees #1	9012	L. Tuscaloosa	956-9012
L-8	MIDWEST-GHOLSON State of Miss. #1	9109	L. Tuscaloosa	1441-9109
L-9	LARCO Lewis #1	12517	Ferry Lake	1840-12516
L-10	SOUTHERN Bass #1	11510	Paluxy	2003-11509
L-11	RIVERSIDE Saucier #1	12024	Paluxy	1888-12018
L-12	VIKING Hibernia Bank #A-1	12209	Paluxy	1758-12209
L-13	SHELL Hibernia Bank #1	9567	Dantzler	80-9567
L-14	GULF Singer et al #1	10473	Dantzler	2525-10470
L-15	LYLE CASHION Davis et al #1	8020	U. Tuscaloosa	1599-8020
L-15A	UNION Entrikin #1	9008	L. Tuscaloosa	117-9008
L-16	ROGER LACY Rayburn #1	8189	Eutaw	2770-8189
L-17	CAROLINA Lide #1	9502	Dantzler	2526-9500
L-18	PACIFIC INTERNATIONAL Ross Beatty et al #1	15468	Hosston	67-15462
L-19	STATE EXPLORATION USA #1	9362	L. Tuscaloosa	1456-9362
L-20	TEXAS Morrow #1	9498	L. Tuscaloosa	75-9498
L-21	MARSHALL YOUNG Powe #1	9044	L. Tuscaloosa	1057-9044
L-22	MARSHALL YOUNG Powe #2	9220	L. Tuscaloosa	1508-9220
L-23	SUN Scanlan & Semmes #A-1	9784	Dantzler	84-9784

MISSISSIPPI STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 5 of 12)

WELLS USED IN ANALYSES

LETCO Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
L-24	LAGRANGE Egloff #1	9652	Dantzler	1050-9652
L-25	UNION Bradshaw #1	8438	Dantzler	63-8538
L-27	HUMBLE Tatum #1	12507	Paluxy	1889-12506
L-29	UNION Pinelands Minerals #1	8046	Eutaw	100-8046
L-30	HELLENIC Saucier #1	12506	Paluxy	1856-12505
L-31	SNOW-BLACK Miller & Jewel #1	4068	Wilcox	1204-4068
L-32	AMERADA Vesely #1	9716	Dantzler	1622-9716
L-35	SUN Tulley #4	8673	Salt	1500-7818
L-38	TEXACO Davis #1	16022	Hosston	2531-16021
L-39	PLACID-SHUBUTA Lucus #4-6	16994	Hosston	90-16988
L-40	HONOLULU Newman Lumber #1	9711	L. Tuscaloosa	78-9711
L-41	FLORIDA Russell #1	17993	Cotton Valley	6668-16700
L-44	TATUM Tatum #2	7545	Eutaw	882-7545
L-46	PLAINS Hibernia Bank #2	5868	Wilcox-Midway	492-5868
L-47	HUMBLE Hibernia Bank #1	6013	Midway	525-6012
L-48	TATUM Tatum #3	6669	Selma	1015-6654
L-49	FREEPORT Tatum #2	1794	Vicksburg	52-1794
L-52	SUNRAY Creosote #1	9013	L. Tuscaloosa	100-9013
L-53	CAROLINE HUNT U.S. Lumber Co. #1	17022	Hosston	74-17022
L-54	EXXON U.S.A. Lamar Cty. Bd. of Supv. #1	16455	Hosston	556-16455
L-55	MORGAN-BORDEN W.A. #1	9138	L. Tuscaloosa	1018-9138
L-56	HAYES ET AL Cayten #17-8	9220	L. Tuscaloosa	711-9220
L-57	TEMPLE Avery #1	9022	L. Tuscaloosa	923-9022
M-1	GULF Westerfield-Hooper #G-1	7868	Eutaw	1620-7868
M-2	HUMBLE Ford #4	12099	Paluxy	1640-12099
M-3	SYSTEM FUELS Paul Hart #1	12824	Paulxy	2034-12824
M-4	GULF Gex #2	9406	L. Tuscaloosa	1598-9406
M-5	GULF Gex et al #A-G-2	8028	U. Tuscaloosa	1601-8028
M-6	FRITZ Ford et al #1	9635	L. Tuscaloosa	1109-9635

MISSISSIPPI STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 6 of 12)

WELLS USED IN ANALYSES

LETCO Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
M-7	AMERADA Rawls #1	9691	Dantzler	2072-9691
M-10	CHEVRON Walker #7-1	12002	Paluxy	1747-12002
M-11	CHEVRON Walker #4	11958	Paluxy	1692-11958
M-12	CHEVRON Walker #5	12484	Paluxy	1676-12484
M-13	CHEVRON Walker 8-7	11986	Paluxy	1736-11986
M-14	CHEVRON Walker #6-1	12032	Paluxy	1712-12032
M-15	MISS-TEX Walker #1	9218	L. Tuscaloosa	1006-9218
M-16	GIBBON Sims-Powell #1	12506	Dantzler	1836-12506
M-17	MOON & HINES Breakfield Owens #1	9222	L. Tuscaloosa	982-9222
M-17A	HUMBLE Evans #3	10958	Dantzler	2018-10958
M-18	HUMBLE Evans #4	9128	L. Tuscaloosa	120-9128
M-18A	HUMBLE Ball #3	10427	Dantzler	118-10427
M-19	Skelly Herring #1	13624	Paluxy	2104-13618
M-20	EXPLORO Bradshaw #4	1342	Catahoula	158-1342
M-21	EXPLORO Hurst #1	1368	Catahoula	75-1368
M-22	EXPLORO Bradshaw #5	3000	Selma	209-3000
M-23	EXPLORO Bradshaw #6	1402	Catahoula	111-1402
M-24	EXPLORO Bradshaw #1	3003	Sparta	105-3003
M-25	GULF Bradshaw #1	1520	Caprock	157-1520
M-26	EXPLORO Bradshaw #8	1396	Catahoula	90-1396
M-27	EXPLORO Cook #1	2995	Wilcox	115-2995
M-28	EXPLORO Bradshaw #3	1315	Catahoula	134-1315
M-29	EXPLORO Bradshaw #2	1403	Catahoula	138-1403
M-30	GULF Bradshaw #4	5673	Midway	30-5673
M-31	PELICAN Pinelands #1	2606	Cook Mountain	No Data
M-32	GULF E. H. Bradshaw #2	9235	L. Tuscaloosa	1025-9235
M-33	GULF E. H. Bradshaw #5	6754	L. Tuscaloosa	2385-6754
M-34	EXPLORO Bradshaw #7	1306	Catahoula	135-1306
M-35	GULF Bradshaw #3	1797	M. Tuscaloosa	32-1797
M-36	LYLE CASHION Bradshaw #1	9508	L. Tuscaloosa	1125-9503

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MISSISSIPPI STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 7 of 12)

WELLS USED IN ANALYSES

LETCO Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
M-37	MISS-TEX Bradley #1	10812	Wash.-Fred.	1395-10816
M-38	CHEVRON Thornhill #1	11000	Wash.-Fred.	1473-10999
M-39	TEXAS CRUDE Rankin #1	10515	Dantzler	1327-10486
M-40	DEEP ROCK Allen #1	10523	L. Cretaceous	120-10523
M-41	TRIAD OIL-MISS-TEX Brown #1	12516	Paluxy	1837-12515
M-42	SKELLY Watts Co. #1	13508	Paluxy	2407-13504
M-43	AMERADA Petroleum Corp. Crawley Unit #1	13312	Mooringsport	2284-13311
M-45	FIRST MISSISSIPPI ET AL B.O.S. #1 16-11	16732	Hosston	7240-16730
M-46	SOUTHDOWN Pittman #1	10723	Dantzler	1388-10722
M-47	FIRST MISSISSIPPI-TEXAS CRUDE Pittman #1	17500	Hosston	7276-17474
M-48	FIRST MISSISSIPPI ET AL Kendrick #1	16918	Hosston	7262-16916
M-49	LATIMER-ET AL Mississippi Indus. Trng. School #1	9305	M. Tuscaloosa	1022-9296
M-51	PARKER Simmons #1	10007	L. Tuscaloosa	80-10007
M-52	HUMBLE M.C. Norman #1	13513	Mooringsport	2143-13512
M-53	MOON-WILLIAMS Robertson #1	13124	Paluxy	1207-13124
M-54	AMERICAN LIBERTY Beard #1	10302	Dantzler	1272-10302
M-55	CARPENTER Amoco-Sabine #1-A	17121	Hosston	7155-17110
M-56	RICHARDSON Randall #1	10154	L. Tuscaloosa	170-10154
M-57	SOUTHEASTERN May #1	13515	Paluxy	2084-13508
M-58	HONOLULU Gaylord Cont. Corp. #1	11506	Wash.-Fred.	35-11504
M-59	MISS. STEEL Barnes #1	13531	Paluxy	2077-13530
M-60	STEKOLL Gex. #1	12455	Paluxy	1740-12450
M-61	HUMBLE Walker #1	9662	Dantzler	103-9662
M-62	HUMBLE Brinson #1-A	2240	Cockfield	50-2240
M-63	HUMBLE Turner #1-A	2266	Cockfield	50-2266
M-64	HUMBLE Robertson #1-A	2174	Cockfield	50-2173
M-65	HUMBLE Evans #2	10217	No Data	106-10217

BEST DOCUMENT AVAILABLE

MISSISSIPPI STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 10 of 12)

WELLS USED IN ANALYSES

LETCO Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
P-62	UNION McLaurin #1 4-13	15033	Bosston	6909-15033
P-63	UNION Masonite #14-3	14921	Caprock	5990-14921
P-64	UNION Masonite #1	14536	Salt	5885-14534
P-65	SHELL Masonite #1	12969	Salt	1502-12918
P-66	SHELL Masonite #21-1	14501	Salt	2405-14499
P-67	EXPLORO Masonite #9	740	Salt	No Data
P-68	EXPLORO Masonite #7	735	Salt	No Data
P-69	EXPLORO Masonite #3	739	Salt	No Data
P-70	EXPLORO Masonite #1	856	Salt	No Data
P-71	EXPLORO Masonite #8	765	Salt	No Data
P-72	EXPLORO Masonite #4	771	Salt	No Data
P-73	EXPLORO Masonite #6	632	Caprock	No Data
P-74	EXPLORO Masonite #5	969	Caprock	No Data
P-75	SHELL Masonite #23-7	14930	Caprock	3944-14930
P-76	EXPLORO Masonite #2	1862	Caprock	742-1862
P-77	EXPLORO Ridgway B-11	640	Caprock	No Data
P-78	MINSEARCH Rich #1	872	Caprock	No Data
P-79	EXPLORO Ridgway B-3	730	Caprock	No Data
P-80	EXPLORO Masonite #10	713	Caprock	No Data
P-81	MINSEARCH Ridgway B-6	765	Salt	No Data
P-82	MINSEARCH Ridgway B-7	702	Caprock	No Data
P-83	EXPLORO Ridgway B-5	682	Caprock	No Data
P-84	EXPLORO Ridgway B-1	672	Caprock	No Data
P-85	GULF Stevens #1	8874	Dantzler	60-8873
P-86	DONALD Donald #1	3100	No Data	No Data
P-87	MINSEARCH Ridgway B-8	779	Salt	No Data
P-88	MINSEARCH Smith #1	1050	Caprock	No Data
P-89	MINSEARCH Ridgway B-9	2601	No Data	No Data
P-90	EXPLORO Ridgway B-2	899	Caprock	No Data
P-91	MINSEARCH Ridgway B-4	--	No Data	--

[redacted]

MISSISSIPPI STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 11 of 12)

WELLS USED IN ANALYSES

LETCO Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
P-92	MINSEARCH Ridgway B-10	717	Caprock	No Data
P-93	EXPLORO Carter #1	700	Caprock	No Data
P-94	MINSEARCH Blackstrom #2	722	Caprock	No Data
P-95	MINSEARCH Cantrell #1	935	Caprock	No Data
P-96	MINSEARCH Blackstrom #1	3000	Wilcox	40-2907
P-97	JETT-SOUTHERN FUELS Reasor #1	7820	U. Tuscaloosa	806-7819
P-98	GULF Runnelstown #1 16-9	13025	Ferry Lake	2084-13024
P-99	COX & HAMON Masonite Corp. #1	9020	Dantzler	1020-9020
P-100	PAN AMERICAN Powe #1-A	14146	Hosston	No Data
P-101	PAN AMERICAN Powe #1	14146	Hosston	2474-14145
P-102	HUMBLE Revet #1-A	2401	Wilcox	50-2401
P-103	O'BRIEN Cox #1	17002	Hosston	82-16995
P-104	MASONITE #1 9-6	15306	Hosston	6005-15274
P-105	EXCHANGE Tablock #1	17571	Cotton Valley	5662-17558
W-1	AMERICAN LIBERTY U.S.A. #1	8445	Dantzler	840-8445
W-2	WYATT U.S.A. #1 BLM-A-037431	13023	Hosston	1952-13022
W-3	TEXACO U.S.A. #1 2-2	8219	L. Tuscaloosa	1006-8213
W-4	CITIES SERVICE U.S.A. #5-1	19286	Smackover	6664-19279
W-5	SISTRUNK Braddock #1	6680	U. Tuscaloosa	404-6680
W-6	HARRIS U.S.A. #1	10027	Wash.-Fred.	1206-10026
W-7	PRUET-HUGHES Trigg #1	12815	Mooringsport	1908-12809
W-8	LARCO Blodgett #1	8525	L. Tuscaloosa	919-8524
W-9	CENTRAL #31-3	12509	Paluxy	1829-12466
MCCG-1	DOE U.S.A. MCCG-1	1899	Salt	0-1896
MCCG-2	DOE U.S.A. MCCG-2	3007	Tallahatta	0-3002
MCCH-3	DOE U.S.A. MCCH-3B*	4104	Tallahatta	0-4100

T-1640K-0

*Deepest well at multiple-hole site

MISSISSIPPI STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 12 of 12)

WELLS USED IN ANALYSES

LETCO Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
MH-4	DOE Rowell MH-4A*	2700	Wilcox	0-2644
MH-5	DOE U.S.A. MH-5A*	3589	Wilcox	0-3587
MH-6	DOE Anderson MH-6A*	3505	Wilcox	0-3502
MH-7	DOE Beard MH-7A*	2850	Wilcox	0-2849
MH-8	DOE Masonite MH-8A*	3708	Wilcox	0-3706
MRIG-9	DOE Masonite MRIG-9	1275	Salt	0-1275
MRIG-10	DOE Masonite MRIG-10	2699	Wilcox	0-2699
MRIG-11	DOE Masonite MRIG-11A*	6041	Selma	0-6041

† Well locations shown in Figure A-4.1

* Deepest well at multiple-hole site

T-1640L-0

MISSISSIPPI STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 8 of 12)

WELLS USED IN ANALYSES

LETCO Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
M-66	SYSTEM FUELS Russel #1	17005	Hosston	3168-16999
P-7	CONTINENTAL U.S.A. #1	21559	Norphlet	618-21542
P-9	HUMBLE Garraway #1-A	2498	Wilcox	50-2498
P-10	CONTINENTAL U.S.A.-Newman #1	11957	Dantzler	1512-11927
P-11	ARMER MOON U.S.A. #1	5010	Wilcox	422-5001
P-12	OHIO U.S.A. #1	10000	L. Tuscaloosa	49-9997
P-13	HUNT-WHITAKER U.S.D.A. #1	9503	L. Tuscaloosa	757-9503
P-14	COURSON NEWMAN LUMBER #2	302	No Data	--
P-15	SHELL U.S.A. #8-6	14010	Paluxy	8973-14009
P-16	SHELL U.S.A. #1 8-11	16119	Hosston	4646-16117
P-16A	SHELL U.S.A. #1	2262	No Data	--
P-17	SHELL U.S.A. #8-14	13900	Paluxy	1400-13855
P-18	SHELL U.S.A. #10-5	9598	Selma	1473-9580
P-19	SHELL U.S.A. #17-6	16506	Hosston	8500-16500
P-20	PHILLIPS Newman #1	8437	Midway	1591-8437
P-21	SHELL U.S.A. #26-11	14476	Dantzler	54-14470
P-22	STANOLIND Masonite #1	9045	Dantzler	350-9045
P-23	RIMROCK TIDELAND Bd. of Supr. #1	9070	Dantzler	934-9012
P-24	UNION Breland #1	16385	Hosston	503-16374
P-25	STATE EXPLORATION Masonite #1	12415	Paluxy	1962-12409
P-26	STATE EXPLORATION Pipkins #1	9017	Dantzler	972-9016
P-27	TEMPLE Jordan #1	9153	Dantzler	777-9153
P-28	GULF-SEABOARD Lott #1	15383	Hosston	90-15378
P-29	HUMBLE Oil & Refining Co. E. C. Hinton #1-A	1645	Cockfield	50-1645
P-30	McMORAN EXPLORATION Co. Cannon #1	16353	Hosston	7400-16351
P-31	MISS. HIGHWAY DEPT.	816	Catahoula	10-815
P-32	SALT DOME Masonite #1	9016	L. Tuscaloosa	1420-9016
P-33	McDERMOTT Draughn #1	13200	Mooringsport	122-13193
P-34	ELLIS-CROW McKenzie #1	10513	Wash.-Fred.	1323-10508

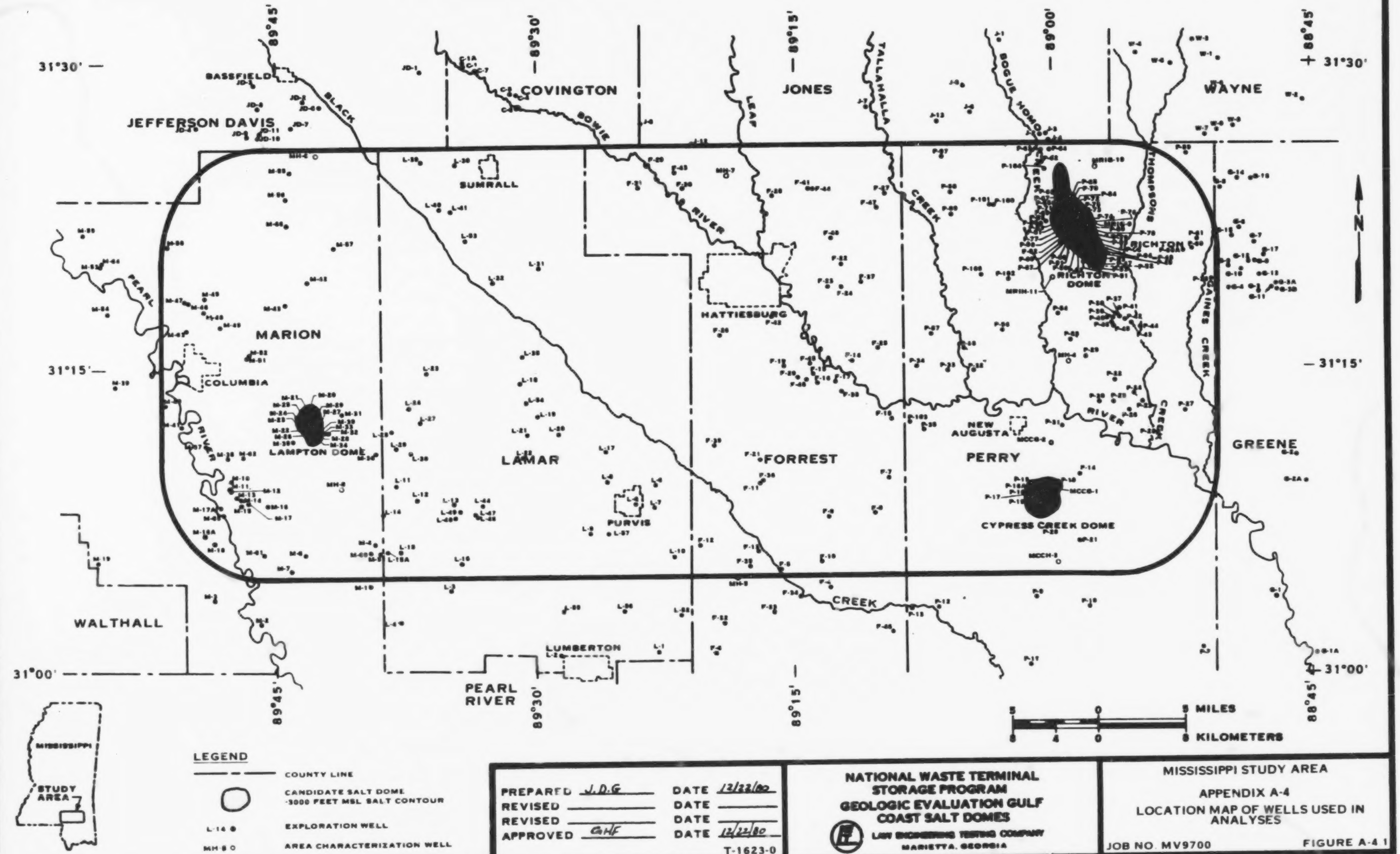
MISSISSIPPI STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 9 of 12)

WELLS USED IN ANALYSES

LETCO Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
P-35	O'BRIEN U.S.A. #29-6	--	No Data	--
P-36	HUMBLE Reasor #1	8004	L. Tuscaloosa	100-8004
P-37	UNION Stevens #A-1	7687	Salt	94-7687
P-38	CENTRAL Stevens #19-9	7179	Salt	648-7170
P-39	CENTRAL Stevens #1	7464	U. Tuscaloosa	664-7463
P-40	UNION Stevens #A-2	8519	L. Tuscaloosa	55-8519
P-41	UNION Stevens #A-3	7479	U. Tuscaloosa	100-7479
P-42	UNION Stevens #A-4	7409	Salt	692-7409
P-43	UNION Cooper #1	13772	Salt	838-13767
P-44	PELTO Richton Tie & Timber Co. #1	12015	Paluxy	2031-12009
P-45	GINTHER Green #1	7410	U. Tuscaloosa	821-7410
P-46	UNION Hinton #1	9909	Wash.-Fred.	100-9909
P-47	MINSEARCH Fisher #1	979	Caprock	No Data
P-48	EXPLORO Carey #1	2000	Cook Mountain	137-1997
P-49	MINSEARCH Carey #1	1312	Caprock	No Data
P-50	MINSEARCH Ridgeway B-12	873	Caprcok	No Data
P-51	MINSEARCH Pope #2	1591	Caprock	No Data
P-52	MINSEARCH Pope #1	583	Caprock	No Data
P-53	MINSEARCH Carter #2	682	Caprock	No Data
P-54	HUMBLE Stevens #1-A	1704	Cook Mountain	50-1704
P-55	LOUISIANA LAND ET AL Reasor #1	16606	Hosston	5684-16534
P-56	YOUNG Smith #1	11499	Paluxy	1607-11474
P-57	TEMPLE & CROW Chancellor Lumber Co. #1	8919	L. Tuscaloosa	980-8919
P-58	CONTINENTAL Richton Tie & Timber Co.	18938	Cotton Valley	69-18938
P-59	CALIFORNIA Walley #1	13857	Hosston	234-13857
P-60	MERRY Masonite #1	7092	Eutaw	625-7092
P-60A	HUMBLE Masonite #7-A	1464	Cockfield	50-1464
P-61	EVANS McClain #1	8722	Dantzler	964-8722


31°30'
89°45'
89°30'
89°15'
89°00'
88°45'
31°15'
31°00'
BASSFIELD
COVINGTON
JONES
WAYNE
JEFFERSON DAVIS
BLACK
BOWIE
LEAF
TALLAHALLA
BOGUE HOMO
THOMPSONS
SUMRALL
RIVER
CREEK
HATTIESBURG
RICHTON
RICHTON DOME
PEARL
MARION
COLUMBIA
LAMPTON DOME
LAMAR
FORREST
PERRY
NEW AUGUSTA
GREENE
TALLAHALA CREEK
BEAVER CREEK
CYPRESS CREEK DOME
PURVIS
WALTHALL
LUMBERTON
PEARL RIVER
N
5 0 5 MILES
8 4 0 8 KILOMETERS
MISSISSIPPI
STUDY AREA
LEGEND
COUNTY LINE
CANDIDATE SALT DOME -3000 FEET MSL SALT CONTOUR
L-14 ● EXPLORATION WELL
MH 8 ○ AREA CHARACTERIZATION WELL

PREPARED J.D.G DATE 12/22/80
REVISED DATE
REVISED DATE
APPROVED GHF DATE 12/22/80
T-1623-0

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA, GEORGIA

MISSISSIPPI STUDY AREA

APPENDIX A-4

LOCATION MAP OF WELLS USED IN ANALYSES

JOB NO. MV9700 FIGURE A-4 1

MISSISSIPPI STUDY AREA

APPENDIX A-5

BRINE DISPOSAL WELLS

The location, operator, injection interval, and injection rates for disposal wells operating within the study area were identified to estimate the potential effects of brine disposal on ground-water hydraulics and water chemistry in the vicinity of wells providing hydrologic data for the Area Characterization report. Brine disposal well data were obtained from the Mississippi State Oil and Gas Board for wells operating in 1979.

Disposal wells are currently operating in the Hub Field in Marion County; the Baxterville Field in Lamar County; Petal Dome, Pistol Ridge and Maxie Fields in Forrest County; and the Glazier and Camp Shelby Fields in Perry County. The heaviest concentrations of disposal wells are in the Baxterville and Hub Fields. Table 14-7 and Figure 14-12 in Volume VI show the locations, operators, injection intervals, and average injection rates for disposal wells in the study area.

APPENDIX B

Sample Analysis

MISSISSIPPI STUDY AREA

APPENDIX B - SAMPLE ANALYSES

B-1 Paleontological Data
B-2 Heavy Mineral Analyses
B-3 Clay Mineral Analyses
B-4 Grain Size Analyses

MISSISSIPPI STUDY AREA

APPENDIX B-1

PALEONTOLOGICAL DATA

Samples from the deepest Area Characterization wells at ten of the eleven sites in Mississippi underwent paleontological examination by Dr. Jules Braunstein of the University of New Orleans, and Dr. Oscar L. Paulson, Jr. of the University of Southern Mississippi, consultants to Law Engineering. Boring DOE Masonite MRIG-9 did not have any fossiliferous samples.

Most of the samples examined were processed drill cuttings. Sidewall cores and rock cores were also examined, when available. The drill cuttings were generally obtained at 3-meter (10-ft) intervals.

The drill cuttings were processed by washing, drying, and sieving according to LETCo Engineering Procedure No. 2.1, "Sample Handling and Description". The sieves used were Number 10 and 230 U.S. Standard sieves. The material which passed through the number 10 sieve and which was retained on the Number 230 sieve was transmitted for paleontological analysis. The sidewall cores were not processed and were transmitted intact for examination.

The samples were examined microscopically by the consulting paleontologists. The fossil assemblages were used to identify biostratigraphic markers which are correlatable to units of the geologic column. Lithologic descriptions were also provided for most of the samples examined. The investigators findings were transmitted to Law Engineering in the form of letter reports included in this Appendix. The locations of the wells are shown in Figure A-4.1.

Report on examination of samples from Law Engineering-DOE USA

MCCG - 1

Samples examined 60 -1195'

60 - 190 loose, coarse white and yellow frosted sand grains, with a zone of white and yellow chert and quartz gravel at 180-190' This interval may all be Pleistocene terrace material.

190 - 230 loose fine to very fine sand

230 - 240 white and red clay fragments

240- 1120 samples show alternating loose fine to very fine sand and white, pink and red clay. Occasional samples contain chert and quartz pebbles, which are probably cavings

1120-25 common shell fragments, of both ribbed and smooth pelecypods, mostly chalky, but some nacreous. Rare worn Elphidium.

1170-1175 chalky and nacreous shell fragments. Rare Rotalia and Trochammina.

1190-1195 yellow massive calcite, gray finely crystaline limestone.

Comment: I interpret the section from 190' to 1190' to be the Hattiesburg Formation, of Miocene age. The zone of shell fragments has nothing diagnostic of age. It is evidently a brackish-water tongue within the Miocene section, possibly equivalent to the Gulf Coast-wide "Rangia" (Miorangia) zone which falls in the upper Miocene. While such a correlation must be considered to be extremely tentative, I find it likely that the zone of shell fragments will turn up in other wells, and so afford a means of correlating the post-Heterostegina zone section.

The lithic material at 1190-95 is cap rock. (The sacks representing the interval 1195-1205 had no samples.)

Jules Braunstein
May 31, 1979

Box 8174 Southern Station
Hattiesburg, MS 39401
April 22, 1979

Mr. Steve Wampler
Law Engineering Testing Co.
4949 Highway 49 North
Hattiesburg, MS 39401

Re: Core sample micropalontological report on MCCG-2

I have completed a detailed analysis of the foraminiferal fauna contained in the first five cores selcted by Spiers, Wampler and Paulson, namely Core Nos. 1, 2, 5, 8, and 11. Core No. 2 was very fine-grained, very angular sand with no microfossils. Core No. 8 was a fine quartz sand with considerable milky and smoky quartz with no fossils.

The other samples were fossiliferous and contained the following assemblages which are indicative of the geologic times shown:

> Core # 11 at ~~[illegible]~~ 145' was a marl or chalk containing Elphidium sagrum, Xestolebris choctawhatcheensis, Siphonina, Eponides, Loxoco ncha, Robulus and other Elpidium too poorly preserved for I.D. The presence of this assemlage is indicative of Miocene sediments.
>
> Core # 5 at ~~[illegible]~~ 2144' was a green clay containing Textularia danvillensis, Siphonina jacksonensis, S. danvillensis, Bitubulogerina howei, Lagena sp., Nonion planatum, Nonionella jacksonensis, Discorbis hemisphaerica, Nonion applini, Textularia mississippiensis, Pseudoglandulina laevigata, Bolivina jacksonensis, Loxoconcha jacksonensis, and a number of other species. This is an excellent Jackson Eocene assemblage.
>
> Core # 1 at 2950' was a glauconitic marl containing Globorotalia topilensis, Ceratobulimina exima, Karrierella mauricensis, Textularia mauricensis, Marginulina, Dentalina, Bulimina, Spiroplectammina and Gaudryina. The first four species are all typical Claiborne species and C. exima is considered a Claiborne index fossil.

We will proceed with an analysis of the remaining cores ASAP and keep you informed as to the results.

Oscar L Paulson
Oscar L. Paulson, Jr.

Box 8174 Southern Station
Hattiesburg, MS 39401
May 7, 1979

Law Engineering Testing Company
4049 Hwy 49 North
Hattiesburg, MS 39401
Attn: Steve Wampler, Rick Wells, James Clark

Re: Micropaleontology of MCCG-2

The following cores were examined for microfossils and identifications and age determinations are recorded for each.

Core # 1 @ 2950'--a white glauconitic marl containing *Ceratobulimina exima*, *Karreriella mauricensis*, *Textularia mauricensis*, *Globigerina topilensis*, *Marginulina sp.*, *Dentalina sp.*, *Bulimina sp.*, and *Gaudryina sp.* are characteristic of the Claiborne Eocene.

Core # 2 @ 2673'--a subangular fine-grained sand with clear milky and smoky quartz contained no fossils.

Core # 3 @ 2534'--a gray waxy clay with *Verneulina* cf. *cushmani*, *Glandulina laevigata*, *Nonion planatum*, *Ceratobulimina exima*, *Globigerina topilensis*, *Siphonina claibornensis*, *Cibicides westi*, and *Anomalina costiana* which is a typical Claiborne Eocene fauna.

Core # 4 @ 2212'--a dark brown glauconitic clay with *Eponides mexicana*, *Siphonina claibornensis*, *Lagena pleniluna*, *Haplophragmoides mauricensis*, *Anomalina costiana* , *Robulus sp.*, and *Cibicides sp.* which are typical Claiborne Eocene species.

Core # 5 @ 2144'--a light gray clay with *Textularia danvillensis*, *T. dibollensis*, *Pseudoglandulina laevigata*, *Guttulina austriacea*, *Nonion applini*, *Nonionella jacksonensis*, *Lagena substriata*, *Bolivina jacksonensis*, *Bitubulogerina howei*, *Discorbis hemisphaerica*, *Siphonina jacksonensis*, *S. danvillensis*, *Loxoconcha jacksonensis*, *Trachyleberis sp.*, and *Globulina sp.* are typical Jackson Eocene species.

Core # 6 @ 2000'--a tan clay with *Siphonina danvillensis*, *Uvigerina cookei*, *U. gardnerae*, *U. glabrans*, *Robulus propinquus*, *R. alato-limbatus*, *Anomalina costiana*, *Cibicides ouachitaensis*, *Lagena acuticostata*, *Quinqueloculina tricarinata*, *Triloculina rotunda*, *Marginulina subbullata*, *Ramulina globulifera*, *Karreriella jacksonensis*, and *Textularia mississippiensis* are typical Jackson Eocene.

BEST DOCUMENT AVAILABLE

Core # 7 @ 1900'--a white fossiliferous limestone contains *Reusella byramensis*, *Siphonina advena*, *Cibicides lobatulus*, *Alabamina mississippiensis*, *Uvigerina vicksburgensis*, and Robulus alato-limbatus which are typical Vicksburg Oligocene species.

Core # 8 @ 1718'--a fine-grained subangular quartz sand with no fossils.

Core # 9 @ 1676'--a carbonaceous, micaceous, sandy clay with no fossils.

Core # 10 @ 1470'-a dark gray, pyritic, waxy clay with *Uvigerina vicksburgensis*, *Liebusella byramensis*, *Textularia sp*. and *Globigerina sp*. suggests an Oligocene age on a limited number of species.

Core # 11 @ 1415'- a white limestone with *Heterostegina israelski*, *Elphidium sagrum*, *Xestoleberis choctawhatchensis*, *Robulus* cf. *americanus*, *Siphonina sp*., *Reusella sp*., *Eponides sp*., and *Loxoconcha sp*. is referred to as the Het zone.

Core # 12 @ 1203'-a white calcareous sandstone with *Robulus americanus*, *Textularia* cf. *stapperi*, *Globorotalia sp*., and *Actin6cythereis sp*. suggest lower Miocene on the basis of this limited number of species.

Core # 13 @ 1105'-a fine-grained sandstone with no fossils.

Core # 14 @ 1023'-a fine-grained sandstone with *Hanzawia texana*, *Planulina harangensis*, *Nonion pizarrensis*, *Ammobaculites agglutinans*, *Lepidocyclina sp*., *Robulus sp*., *Cibicides sp*., *Globorotalia sp*., and *Siphonina sp*. are characteristic of lower Miocene *Planulina harangensis* zone (Ellisor, 1940).

Core # 15 @ 973'--a fine-grained calcareous sandstone with a few unidentifiable fragments of fossils.

Core #16 @ 879'---a fine-grained sandstone with no fossils.

Core # 17 @ 710---a fine-grained, rounded to subangular sandstone with no fossils.

Core # 18 @ 627'--an olive clay with *Uvigerina altacostata*, *Cibicides concentricus*, *Globigerina bulloides*, and *Amphistegina sp*. suggests lower/middle Miocene.

Core # 19 @ 499'--a brown, sandy, glauconitic clay with *Globorotalia fohsi*, *Bulimina pupoides*, *Uvigerina altacosta*, *Cibicides concentricus*, *Bolivina* cf. *floridana*, and Robulus sp. which are middle Miocene fossils.

Core # 20 @ 470--a very fine-grained, clayey sandstone with *Uvigerina peregrina*, *U. auberiana*, *Liebusella sp*., *Lenticulina jeffersonensis*, *Bulimina pupoides*, *Siphonina sp*., and *Amphistegina sp*. which are characteristic of the middle Miocene (Ellisor, 1940).

I believe the next step in trying to assess the stratigraphic sequence at Cypress Creek is to compare the samples run on the Gulf Stephens with those on MCCG-3A and to also compare the electric logs of all surrounding wells. We have established the tops in the Gulf Stephens well and a comparison of all data obtained thus far will show us what parts of the section can be correlated with certainity and what portions need more detailed work, e.g., an examination of cuttings close to suspected formation boundaries in MCCG-2 and MCCH-3A.

I will begin to prepare the samples on MCCG-1 unless there is something that you would like to have done to answer any of the above questions.

Oscar L Paulson

P.S. Copies of pertinent publications by Gravell & Hanna, Ellisor, and Akers & Drooger are attached for your use in understanding the paleontologic report herewith submitted.

AUG 1979

August 21, 1979

Mr. Rick Wells
Law Engineering Testing Company
2749 Delk Road, SE
Marietta, GA 30067

Dear Rick:

After returning from my visits with J. Braunstein and H.V. Andersen, I proceeded to examine samples from intervals above the sandy, glauconitic marl at 3000-3100' in MCCH-3B to determine if the lower Jackson fossils found in this interval could have come from higher zones. The bryozoans reported in my letter dated July 31, 1979, at 3030-40 were not found above this horizon. The larger formas from 3050-60, 3080-90, 3090-3100 had sandy, glauconitic marl adhering to the shells. This lithotype is the same as that of the washed sample from which the fossils were taken and distinctly different from the fine white limestone found between 3160-3360 and containing the characteristic Cook Mountain fossil *Polylepidina gardnerae* and a *Discocyclina* which is probably *perpusilla*. Lower Jackson fossils, including larger formas, were found as high as 2850.

However, the sidewall core from 2902 contained the following fossils:

2902 - Siphonina danvillensis, Siphomorphina jacksonensis, Lamarckina byramensis, Nodobaculariella scita, Massilina jacksonensis punctato-costata, Marginulina cocoaensis, Nodosaria radicula, Bulimina ovata, Ceratobulimina alazensis, Lagena striata, Nonionella hantkeni spissa, Loxoconcha concentrica, Cytheropteron danvillensis, Haplocytheridea montgomeryensis, Uvigerina gardnerae, Eoeponidella (Discorbis) hemisphaerica, Pijpersia (Discorbis) orbicularis, Amphistegina pinarensis.

These forams and ostracods are normally found in the Shubuta.

The sample from 2890-2900 in 3B contained Textularia dibollensis, Cibicides planoconvexa, Liebusella byramensis, Elphidium, Uvigerina, Operculina mariannensis, Spiroplectammina mississippiensis alabamensis, Dentalina or Marginulina, Operculina vaughni or willcoxi, which are upper Jackson forams.

The samples from 2770-90 contained Bulimina ovata, Bolivina gracilis, Bolivina amygdaeloidea, Ramulina globulifera, Nonionella jacksonensis, Discorbis tentoria, Robulus vicksburgensis, Loxostomum vicksburgensis. On the basis of a limited number of species, this would appear to be Vicksburg.

In addition to the above up-hole samples, one sample from below the zone in question was studied. This sample from 3130-40 contained Lagena substriata, Angulogerina cooperensis, Nonionella jacksonensis, Spiroplectammina mississippiensis, Pijpersia (Discorbis) globula-spinosa, Bolivina dalli, Bolivina retifera, Uvigerina sp.

This is not a very distinctive assemblage since a number of these species have been reported from both Claiborne & Jackson. However, the washed samples show a distinct change with more abundant tan & gray clay sparse fauna which appears to be more like the Cockfield.

Sincerely yours,

Oscar L. Paulson Jr

Oscar L. Paulson, Jr.

OLPjr/drl

AUG 1979
RECEIVED

Report on samples examined from Law Engineering-DOE-USA,MCCH -32

Samples examined,1600'- 4100'.

1600-10 loose fine to coarse sand, few siderite nodules and shell fragments- probably in Catahoula

1740 light gray finely sandy limestone to calcareous fine sandstone, very finely pyritic, common Sorites - top of Heterostegina zone

1910- 1920 first observed Heterostegina

2100-10 Cibicides hazzardi-top of Chickasawhay

2280-90 white limestone, Operculinoides cf.vicksburgensis-top of Vicksburg

2290-2300 limestone as above, Lepidocyclina mantelli

2500-10 decrease in limestone, increase in loose sand grains - possibly represents the top of the Red Bluff(lower Vicksburg of surface).That this is a clay unit is shown by the sidewall cores at 2550, 2600 and 2650, all of which were greenish-gray calcareous clay.

2660-70 increase in white to buff limestone fragments - possible Ocala

2750-60 common Cristellaria, Operculinoides cf. willcoxi

2790-2800 common white limestone, very finely glauconitic and sandy, Camerina jacksonensis - probably Moodys Branch

2810-20 abundant loose dark green glauconite, and brown glauconite - probably washed out of a clay interval, representing the Gosport (Cockfield, top of Claiborne).

3010-3020 some white finely glauconitic, finely sandy limestone- probably top of Cook Mountain

3080-3090 large Camerina (Cook Mountain marker

3160-3170 Polylepidina gardnerae

3360-3370 decrease in limestone, gray and tan clay fragments - probable top of Cane River (Zilpha Clay) - no evidence of Sparta

3560-70 abundant dark green glauconite -Winona (marl lost in washing)
(note: sidewall core at 3562 is greenish-gray,highly glauconitic marl)

Below this point, the cuttings are poorer, with much caved material. The next lower sidwall core, at 3670, is of chocolate brown,glauconitic, MCCH- 33 continued

calcareous clay, a lithology found in the Tallahatta

3950-4100 cuttings contain typical lower Tallahatta buhrstone

sidewall cores at 4050 and 4070 are of light greenish gray, hard, very finely glauconitic siliceous siltstone (buhrstone) - therefore, there is no evidenwe in either set of samples that this well reached the Wilcox.(The electric log character at 4090 suggests Wilcox, but there was no recovery of the sidewall core attempted at 4090.)

Jules Braunstein
May 31, 1979

September 20, 1979

TO: Rick Wells

FROM: Oscar L. Paulson, Jr.

MH -4A [illegible] 11/12/79

Washed samples from ~~MCCH-~~4A were examined for microfossil content between depths of 1300 and 1700. This section starts in typical Vicksburg with such forams as Planorbulina, Lepidocyclina, Articulina byramensis, Gumbelina cubensis, and Palmula caelata.

Shubuta fossils Ceratobulimina alazensis and Palmula caelata occur in the sample at 1450-60. Operculinoides willcoxi and O. ocalanus were found in sample at 1490-1500.

Moodys Branch glauconitic marl containing Camerina moody branchensis first occurred in sample from 1570-80 with other Moody Branch forms such as Camerina jacksonensis and Operculina mariannensis from 1580-90 and 1590-1600. The last sample with Moodys Branch lithology and fauna was found in sample from 1630-40 with Operculina vaughni and Camerina moody branchensis just above.

Sample from 1650-60 contained Operculina cf. sabinensis, and sample from 1670-80 contained Polyledina gardnerae; both Claiborne fossils.

The lithologic and faunal characteristics of the Moodys Branch and Cook Mountain are the same as those noted in MCCH-3B, but in this well (4A), there is no Cockfield lithology.

OLPjr/drl

Oscar L Paulson Jr

Report on samples examined from Law Engineering Company DOE-Rowell MH 4-A, Section 3- 3N - 10W, Perry County, Mississippi

0 -800 interbedded loose medium to coarse sand with some quartz and chert pebbles, and red and pale green clay: probably Hattiesburg formatio

800 - 930 light gray to white, finely sandy fossiliferous limestone, grading into calcareous fine sandstonem common mollusc casts, shell fragments, *Sorites*, *Heterostegina*, *Miogypsina*: Heterostegina zone

930 - 1070 samples mostly loose , angular fine to medium sand, with dark chert grains : may represent Chickasawhay, but no typical lithology nor fossils were observed

1070 - 1250 white, finely porous, somewhat chalky limestone, common ostracods, *Amphistegina*, *Elphidium*, *Lepidocyclina*, *Operculinoides* + Vicksburg

1250- 1380 white, finely glauconitic, chalky limestone; Ocala

1380- 1410 light gray marl, abundant loose, coarse glauconite, abundant small foraminifera (first Moodys Branch marker, Camerina jacksonensis observed at 1470) :Moodys Branch

1410 - 1640 samples carry much caved limestone from above, with some light gray calcareous shale, and dark grren glauconitic clay- should be Cockfield, but is not typical of Cockfield lithology

1640 - 1790 white, very finely glauconitic, very finely sandy white limestone, with abundant shell fragments, large *Camerina* (probably *mississippiensis*) : Cook Mountain

1790 - 2080 brown, slightly calcareous shale with small foraminifera, some intervals of extremely abundant dark green glauconite, *Cyclammina caneriverensis* : Cane River (Zilpha)- may also include Sprta equivalent.

2080 - 2150 pale gray to greenish gray calcareous shle, finely glauconitic white limestone, *Discocyclina advena*

2150 - 2350 pale, greenish white, very finely glauconitic and dandy, calcareous claystone, with conspicuous amounts of pale greenish-white pseudobuhrstone between 2190 and 2270 : Tallahatta

[redacted]

2350- 2360 no sample

2360 - 2710 (last sample) Wilcox

2360- 2390 light gray, very finely carbonaceous and micaceous, friable very fine sand, with common aggregates of very finely crystalline pyrite

2390 - 2450 mostly very finely micaceous brown shale

2520- 2550 common hard brown very finely sandy limestone to calcareous fine sand, with some included glauconite and shell fragments + Bashi Marl member of the Hatchetigbee (uppermost Wilcox formation).

7/25/79

Jules Braunstein

Report on samples examined from Law Engineering DOE-USA MH-5A
Section 4 -1N-13W, Forrest County, Mississippi

50- 1450 interbedded coarse white-yellow-pink sand with some small quartz and chert pebbles, and pink to red, and yellow-green clay: Hattiesburg Formation, and probably Catahoula

1460-90 some white, very finely sandy limestone with barnacles, shell fragments and Sorites - Heterostegina Zone

1490-1500 white, very finely xline limestone, *Miogypsina*

1520-30 common *Heterstegina*

1620-30 abundant white, very finely porous, very finely sandy limestone- probably Chickasawhay

1720-30 white sandy limestone with mollusc casts - probably Vicksburg

1730-40 *Lepidocyclina mantelli*

1740-50 *Rotalia byramensis*

1940-50 soft, gray, very finely sandy marl, common Liebusella - probably Red Bluff (Lower Vicksburg)

2010-20 white, very finely porous, chalky limestone - Ocala

2090-2100 very finely glauconitic white limestone, *Camerina jacksonensis* - Moodys Branch marl

2100-10 common loose, dark green glauconite, *Camerina moodybranchensis*

2130-40 dark green, slightly calcareous shale with included foraminifera - Cockfield (Gosport)

2140-50 brown, fossiliferous shale, *Eponides yeguaensis*

2190-2200 gray, very finely glauconitic and sandy limestone with included shell fragments and foraminifera - Cook Mountain

2210-20 *Polylepidina gardnerae*

2410-20 soft, brown shale - Cane River (Zilpha)

2586 (sidewall core) greenish-gray, highly glauconitic marly siltstone- Winona

2620-30 white, chalky, very finely glauconitic limestone, *Discocyclina advena*

2880-90 buff to gray, calcareous, very finely glauconitic claystone-
Tallahatta

2930-40 some brown, finely micaceous and carbonaceous shale - Wilcox

Jules Braunstein
June 30, 1979

Description of sidewall cores from Law Engineering DOE-USA MH-5A, 4-1N-13W, Forrest County Mississippi

1 3074 dark bron, slightly carbonaceous, very fine sand
2 3060 dark brown shale, partings of white very fine sand
3 3043 gray, very fine sand with lignite partings
4 3013 soft, dark gray, medium-fine sand, with sand-size chert grains
5 2987 chocolate-brown shale with laminae of gray siltstone
6 2962 very glauconitic, finely micaceous very fine sandstone
7 2946 gray, finely micaceuos very fine sand
8 2938 gray-green, very glauconitic very fine sand
9 2930 chocolate-brown shale
10 2924 gray-green very glauconitic fine sand with shell fragments
11 2880 gray-green glauconitic fine sand with shell fragments
12 2840 soft, gray, very finely glauconitic very fine sand
13 2804 soft, gray-brown, finely glauconitic fine sand
14 2766 gray, very finely glauconitic, slightly calcareous fine sand
15 2702 light gray, slightly calcareous, abundantly finely glauconit clay
16 2650 soft, white, abundantly finely glauconitic marl
17 2600 no recovery
18 2586 greenish-gray, highly glauconitic, marly siltstone with shell fragments and Discocyclina
19 2560 greenish-gray, highly glauconitic marl, abundant Operculinoides
20 2516 chocolate-brown, very glauconitc clay, shell fragments
21 2500 chocolate-brown, glauconitic, foraminiferal clay, some fragments of white glauconitic marl with shell fragments
22 2494 brown, glauconitic marl, abundant Operculinoides
23 2450 chocolate-brown, calcareous clay with foraminifera
24 2390 soft gray very fine sand
25 no sample
26 2316 white marl, Operculinoides
27 2280 white marl

28	2265	white marl, abundant very fine glauconite, *Camerina* (thick)
29	2251	white marl, very finely glauconitic, *Camerina*
30	2160	dark green to black, very glauconitic, slightly calcareous fine to very fine sand
31	2106	soft white marl, scattered fine glauconite
32	2050	white limestone, scattered fine glauconite
33	1980	gray-green calcareous clay
34	1924	lightgray to buff calcareous clay
35	1806	hard, pale green, very finely glauconitic very fine sand
36	1750	soft white marl
37	1698	white, very finely glauconitic, calcareous very fine sand
38	1522	soft white marl
39	1390	soft brown very fine sand, lignite partings
40	1341	no recovery
41	1290	no recovery
42	1280	no recovery
43	1270	no recovery
44	1220	fine to coarse loose sand
45	1108	gray-green, loose, medium to coarse sand, shell fragments
46	1066	light gray to green clay
47	1016	yellow-green soft clay
48	950	soft gray fine to medium sand
49		no recovery

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Report on samples from Law Engineering, DOE-Anderson MH 6A, Sec.4,

5N-17W, Marion County,Mississippi/ Samples examined 11.8-3400.

11.8-240 section of loose medium to coarse sand and chert and quartz pebbles
240-290 mostly white to gray clay
290-420 loose fine to coarse sand
420-450 white to buff clay
450-480 red to orange clay
480-670 loose coarse sand, white-yellow-orange chert and quartz pebbles
670-yellow-gray finely sandy clay, some ochre clay, interbedded with loose medium-fine sand
860-1020 mostly loose medium to very fine sand, coarse siderite nodules between 860 and 890
1020-1090 Heterostegina zone
1020-1030 rare *Heterostegina*
1040-1050 white, fossiliferous,somewhat chalky limestone
1090- base of Heterostegina zone - decrease in limestone,abundant sand
1090-1600 section of interbedded medium-fine sand and gray and green waxy clay
1600 -1820 Vicksburg
1600-1610 abundant white chalky limestone,*Operculinoides muiri*
1820-2070 Jackson:
1820-2000 Yazoo - brown shale, *Bulimina jacksonensis*
2000-2070 Moodys Branch - white,glauconitic,very finely sandy limestone, *Camerina moodybranchensis*, *Camerina jacksonensis*
2070-2260 Cockfield sharp decrease in limestone, very abundant loose coarse to fine sand, lignite fragments
2260-2440 Cook Mountain - *Ceratobulimina eximia*
2330-2440 Cook Mountain limestone white chalky very finely glauconitic limestone, *Camerina mississippiensis*
2390-2400 *Polylepidina gardnerae*
2440-3030 Zilpha - section mostly brown shale, occasional intervals with abundant glauconite, shell fragments, and siderite
3030- 3170 Winona pale green to gray finely glauconitic marl, and very finely glauconitic limestone
3170-3280 Tallahatta white,very finely glaucnitic,very finely sandy limestone to very calcareous sandstone, sections with pseudobuhrstone
3280-total depth Wilcox
3280-90 sample almost entirely loose coarse sand grains (opaque, possibly chalcedony)
3290 some very finely glauconitic, white, calcareous sandstone to sandy limestone - Bashi

Jules Braunstein
3/3/80

Report on samples examined from Law Engineering-DOE-USA MH-7A

Samples examined 60 - 2850

60-120	loose white, yellow, and pink quartz and chert pebble gravel and coarse white and yellow quartz sand - probably Pleistocene terrace material
120- 640	interbedded pale yellow sandy clay, pink clay, loose fine sand, and loose coarse sand - Hattiesburg formation, and possibly Catahoula
640-50	soft white porous limestone, echinoid plates, *Amphistegina*, *Miogypsinoides* - top of Heterostegina zone
650-660	limestone as above with mollusc molds, *Heterostegina*
720-30	decrease in limestone, common loose fine to medium sand - base of Heterostegina limestone
830-40	pale yellow, slightly calcareous shale - possible Chickasawhay
900-910	some white, finely sandy limestone with included pelecypod fragments, *Cibicides hazzardi*
1050-1060	very abundant white, somewhat chalky limestone, common *Lepidocyclina* cf *mantelli*, and *Operculina* - Vicksburg
1190- 1200	common dark green glauconite, *Marginulina fragaria texasensis* Yazoo clay
1210-20	some white chalky limestone, large chalky pelecypod fragments, common *Cristellaria* spp., *Bulimina jacksonensis* and other Yazoo clay foraminifera
1360-70	*Operculinoides barkeri* - Moodys Branch marl
1380-90	*Camerina jacksonensis*
1540-50	common fragments of massive siderite with embedded sand grains and glauconite - possibly Cook Mountain
1550-60	*Ceratobulina eximia*
1620-30	very finely glauconitic white limestone
1630-40	*Operculinoides oliveri*, *Camerina mississippiensis*
1700-10	*Polylepidina gardnerae*
1860-70	Brown shale, massive siderite - top Zilpha (Cane River)
2140-50	white to pale green finely glauconitic limestone - Winona
2170 - 80	*Discocyclina advena*
2230-40	white, finely glauconitic,calcareous siltstone - Tallahatta
2370-90	loose,very coarse sand with green stain, loose fine to coarse glauconite - basal Claiborne or top Wilcox
2390-2400	first lignite fragments - definite Wilcox
2540-2560	hard, tight, tan, slightly calcareous, very glauconitic

[redacted]

fine sand with included chalky shell fragments - Bashi

2560-2850 mostly loose fine to medium sand, with common lignite fragments between 2700 and 2720

12/3/79

Report on examination of samples from Law Engineering, DOE-Masonite , MH-8A, Sec 10-2N-17W, Marion County, Mississippi. Samples examined 10.5' to 3700'.

10.5-50 loose fine-medium sand, frequent pink and yeelow grains
50 - 170 white, ochre and pink clay, with common lime nodules between 60 and 170'
170 - 280 loose coarse to very coarse sand, common chert pebble fragments
280-420 mostly pale yellow-green, gray, and pink clay, with common volcanic glass between 330 and 350
420-630 loose medium-coarse sand, common dark chert grains
630-1350 interbedded quartz and chert pebbles and pale green and pale gray waxy clay
1350 small gastropods and fragments of larhe gastropods, frequent *Amphistegina*, rare *Sorites* - Top of Heterostegina zone
1360- 70 white chalky limestone,common shell fragments
1400-10 first observed *Heterostegina*
1640- 50 decrease in limestone, fragments of green waxy clay- in Chickasawhay
1880-90 white limestone, abundant *Operculinoides muiri* and *Lepidocyclina* - Top of Vicksburg
2030 - mostly loose amall foraminifera including *Textularia*,*Cibicides*, *Liebusella* - Top of Yazoo Clay
2130-40 common *Bulimina jacksonensis*
2160 2230 brown shale with abundant foraminifera
2230-40 change to white limestone, *Operculinoides barkeri* - Top of Moodys Branch
2290-2300 some dark brown, very finely micaceous shale - Top of Cockfield
2390-2400 abundant white limestone, finely glauconitic in part, and white fossiliferous finely crystalline limestone - Top of Cook Mountain
2450-60 *Camerina mississippiensis* , *Polylepidina gardnerae*
2560-70 common brown shale, veryfinely micaceous - Top of Zilpha
2960-70 white, finely glauconitic marly limestone - Top of Winona
3040-50 light gray to white, very finely glauconitic pseudobuhrstone- Top of Tallahatta
3110-3160 samples poor
3160 - 70 hard, tight, buff to gray calcareous, abundantly finely glauconite fine sand with included mollusc fragments - Top of Bashi(Wilcox).

Jules Braunstein
December 14, 1979

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PALEONTOLOGICAL SAMPLE REPORT

LAW ENGINEERING-DOE USA MRIG-9

The cuttings samples from this boring were not submitted for paleontological examination because they were not fossiliferous.

Report on examination of samples from Law Engineering, DOE-Masonite ~~3426~~ MR16 - 10, Sec 12-5N-10W, Perry County, Mississippi.

0 - 150 soil and terrace material - loose medium-coarse rounded sand with pink stain, chert and quartz pebbles, medium to coarse sand

150-830 Hattiesburg formation - pale yellow clay, yellow-green waxy clay, brown clay, aggregates of crystalline pyrite, loose coarse sand

830-950 Heterostegina zone - white, porous, chalky limestone, echinoid plates, shell fragments, Heterostegina, Miogypsinoides, Sorites

950-1200? Chickasawhay - yellow-green, green, and pale gray clay with interbedded white, porous, fossiliferous limestone; mollusc molds, echinoid spines, Amphistegina, Elphidium

1200-1300 Possible Vicksburg - white finely sandy limestone, sparse Lepidocyclina

1300 - Possible Ocala - white glauconitic limestone, Operculinoides

1400 - abundant white chalky limestone, Liebusella, large Robulus

1500-1570 abundant Bulimina jacksonensis and small foraminifera

1570-1600 Moodys Branch - white chalky limestone, Operculinoides barkeri

1600-1850 Possible Cockfield - light gray, calcareous, fossiliferous shale, interbedded with white, glauconitic limestone, abundant Camerina

1850-1980 Cook Mountain-white, marly limestone, Ceratobulimina eximia, common fresh dark green glauconite, Camerina mississippiensis

1980-2320 Zilpha - gray to brown shale, very abundant loose dark glauc.

2320-2420 Winona - sparse white very finely glauconitic chalky limestone, white, chalky limestone, abundant Discocyclina advena

2420-2620 Tallahatta - pale gray to greenish gray, very finely glauconitic siltstone with brown shale partings; between 2500 and 2530, greenish-white, very finely glauconitic and micaceous pseudobuhrstone

2620- TD Wilcox - loose coarse sand grains, some with green stain; below 2660, greenish-gray, very finely micaceous shale, rare lignite

Jules Braunstein
November 19, 1979

Report on examination of samples from Law Engineering-DOE-Smith
MRIH-11A

10-230 Probably terrace material - loose medium to fine, pink sand, pink and white clay, pink and yellow quartz and chert pebbles, coarse white and yellow sand

230-700 Hattiesburg formation(yellow-green clay 230-280,white and yellow quartz and chert, interbedded with yellow-brown clay 280-700

700 Top of Heterostegina zone -*Miogypsinoides*,*Sorites*,echinoid spines

710 white, porous chalky limestone, *Heterostegina*, bryozoa,shell frags

780 buff, saccharoidal, very finely sandy limestone - possibly in Chickasawhay

820-880 white, sandy limestone to limy sandstone

890 Possible Vicksburg - tight,white limestone, shell fragments, large *Amphistegina*

960-990 buff,tight, finely sandy, very glauconitic limestone, rare *Lepidocyclina*

1160 Probable Ocala - abundant white chalky limestone

1370 Probable Moodys Branch - common *Camerina moodybranchensis*

1400 *Camerina jacksonensis*

1560-1690 Cook Mountain - common white limestone, *Ceratobulimina eximia*

1570 *Discocyclina perpusilla*

1580 *Camerina mississippiensis*

1690-1950 Zilpha - decrrease in limestone, common very slightly calcareous brown shale

1740 *Cyclammina caneriverensis*

1950 - 2040 Winona - light brown, glauconitic, fossiliferous calcareous shale to marl

1960 *Discocyclina advena*

2040- 2160? Tallahatta - greenish white, finely to very finely glauconitic, calcareous siltstone

2160 Possible top of Wilcox - some loose very coarse sand grains

2170 increase in coarse sand, some with green stain (probably washed out of a green clay)

2220 Definite top Wilcox - sparse lignite fragments

2230 abundant loose fine to coarse sand grains

2310 Bashi - hard,white,slightly calcareous,very glauconitic fine sandstone with zome included mollusc fragments

2512-2530 (high resistivity streak on E log) - tight brown limestone, sandy in part

2670-2680 (high resistivity streak on E log) hard,light gray, calcareous, fine to very fine sandstone, very glauconitic,included shell frags

3100 - 5400 samples examined only sporadically

5400-5510 in Porters Creek (Midway) - dark gray - black very finely micaceous shale

5510 Top of Cretaceous - light gray chalk with included abundant small foraminifera, *Globotruncana arca*, *Anomalina*

Jules Braunstein
November 15, 1979

[redacted]

MISSISSIPPI STUDY AREA

APPENDIX B-2

HEAVY MINERAL ANALYSES

Heavy mineral assemblages and grain-size distributions of selected split spoon samples were analyzed by Dr. W. C. Isphording, consultant to Law Engineering, to determine if mineralogical criteria could be established to differentiate the sands and clays of the Hattiesburg Formation from those of the Citronelle Formation. General criteria were developed from these mineralogical analyses and were applied to identify Hattiesburg and Citronelle samples.

Processed split spoon samples from the Area Characterization shallow borings were sent by Law Engineering to Dr. Isphording. The details of sample collection are discussed in Appendix A-2 and the sample processing procedure is outlined in Appendix B-4.

Heavy minerals from selected portions of the samples were separated and analyzed by Dr. Isphording using optical techniques. X-ray analyses of clay particles on selected samples were also performed by Dr. Isphording.

The analysis was divided into three phases. Phase I consisted of analyzing the data (heavy mineral identification, grain-size distribution, and clay mineralogy) of 100 known Citronelle and Hattiesburg samples to identify those parameters that could best be used in the differentiation of the two formations. Phase II consisted of the identification of 24 unknown samples by the criteria established in Phase I. Phase III was performed to determine if variations of the heavy mineral suite identified in the Hattiesburg Formation at Cypress Creek and Richton Domes were caused by differences in stratigraphic position.

Dr. Isphording's report of the Phase I, Phase II, and Phase III work is contained herein.

[redacted]

REPORT OF INVESTIGATION

MINERALOGICAL DIFFERENTIATION OF HATTIESBURG-CITRONELLE UNITS IN VICINITY OF RICHTON AND CYPRESS CREEK SALT DOMES, PERRY COUNTY, MISSISSIPPI

(PHASE 1 DATA)

SUBCONTRACT NUMBER 11930 ISSUED TO W.C. ISPHORDING UNDER SUBCONTRACT NO. E-512-00400, LAW ENGINEERING TESTING COMPANY, MARIETTA, GEORGIA BY BATTELLE MEMORIAL INSTITUTE, PROJECT MANAGEMENT DIVISION, OFFICE OF NUCLEAR WASTE ISOLATION UNDER CONTRACT EY-76-C-06-1830, ASSIGNED BY THE UNITED STATES DEPARTMENT OF ENERGY

RECEIVED
AUG - - 1980

SUBMITTED BY:

W. C. ISPHORDING, PH.D.
CONSULTING GEOLOGIST
P. O. BOX 2243
MOBILE, ALABAMA 36688

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REPORT OF INVESTIGATION

MINERALOGICAL DIFFERENTIATION OF HATTIESBURG-CITRONELLE UNITS IN VICINITY OF RICHTON AND CYPRESS CREEK SALT DOMES, PERRY COUNTY, MISSISSIPPI

PHASE 1 STUDY

METHODOLOGY

The necessity of carrying out detailed sediment analyses in the Richton-Cypress Creek ares arises from a need to identify sand and clay units belonging to the Hattiesburg and Citronelle formations. Though the Citronelle Sand (its formal name) is younger than the Miocene Hattiesburg Formation (Plio-Pleistocene, see Isphording and Lamb, 1971) and is largely of fluvatile origin, whereas the Hattiesburg is chiefly a marine unit, both possess strata that were deposited under similar environmental conditions. Transitional marine units (lagoon, swamp, estuary, etc.) are not uncommon in the Hattiesburg and can also be identified in the Citronelle Sand. Eastward, fluvatile units become increasingly common in the Miocene-age sediments, making differentiation of the Citronelle and Hattiesburg even more difficult (see Isphording and Flowers, 1980; Isphording, 1977). Accordingly, for the samples provided from the Richton-Cypress Creek salt dome areas, size frequency distributions, heavy mineral and light mineral content and clay mineral analyses were examined to determine if any variable, or combination of variables, was present that would allow the two formations to be identified in drill cores or in outcrop.

Procedure.-- Samples from split-spoon drill cores were process by Law Engineering Testing Company and supplied in fractions sieved on a one phi interval from -6 phi to +4 phi (64 mm to 1/16 mm). The +3 phi fraction of each sample (1/4 mm to 1/8 mm) was then immersed in acetylene tetrabromide (S.G. = 2.96) to separate the high specific gravity minerals from the "light" mineral portion. Where too few grains were obtained in the +3 phi interval, separations were also carried out on the +4 phi fraction (1/8 mm to 1/16 mm). Following gravity separation, the heavy minerals were weighed to the nearest ten-thousandth gram and mounted on glass slides using AEROCHLOR 4465 (Index of Refraction = 1.66). The percentage of the various mineral species present on each slide was then determined by means of standard, referenced procedures (see Tickell, 1940; Milner, 1940, etc.). Where possible, at least 300 grains were counted in order to satisfy the statistical requirements for precision and accuracy as outlined by Dryden (1931). Where fewer grains were present on the slide, all grains were counted. In no case was quantitative frequency information used if the slide contained fewer than 100 grains (or less than 5 species). It should also be noted that even though mineral percentages are reported to the nearest tenth percent in Appendix I, binomial probabilities do not justify this and the figures are for convenience only so that means, standard deviations, histograms, etc. may be calculated or constructed (in actual fact, it can be shown that mineral frequencies follow a Poisson distribution and that over 100,000 grains would have to be counted to justify reporting to the nearest tenth percent!). Similar analyses were carried out on selected slides of the "light" mineral fraction, except that these were mounted in Canada Balsam (Refractive

Indes = 1.54). Other bulk samples supplied by LETCO were analyzed for clay mineral content using a Philips X-ray Diffraction System equipped with a copper tube and single crystal (graphite) monochrometer. These analyses were combined with those from other samples (supplied by LETCO) for comparative analysis. Statistical analyses, including measures of central tendency and dispersion, and discriminant analysis, were then carried out, using procedures outlined in Davis (1973) to determine the most efficient means of differentiating the Hattiesburg and Citronelle formations in the vicinity of the Richton and Cypress Creek salt domes.

Size Frequency Distributions

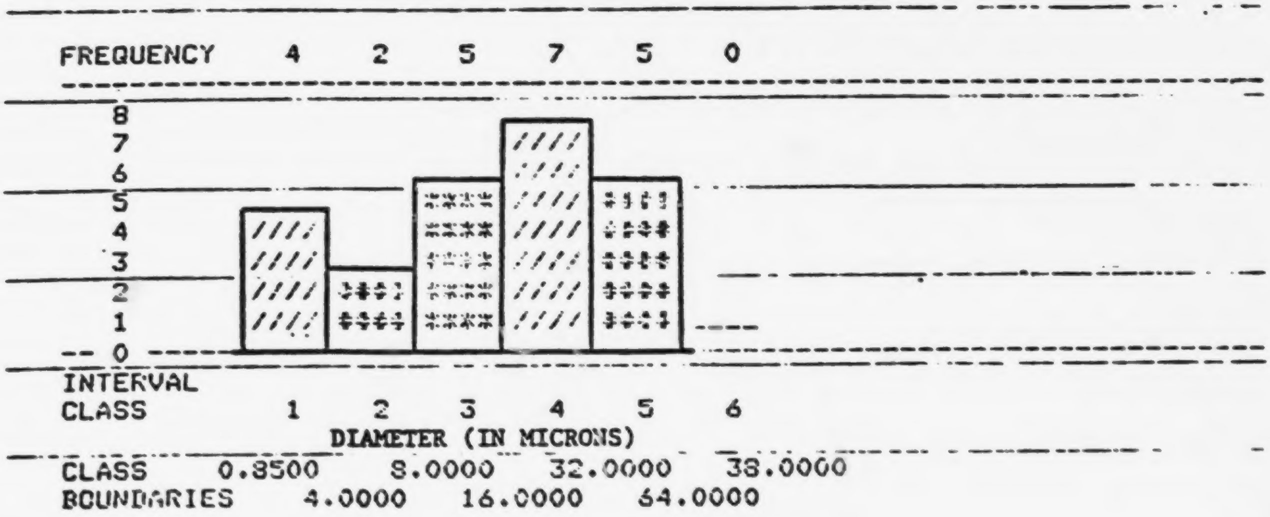
Comparison of median diameters for 101 samples of sands and clays from the Citronelle and Hattiesburg formations are shown below and, graphically, in Figure 1.

	Mean (in microns)	Standard Deviation	Skewness	Kurtosis	Coefficient of Variation
Hattiesburg Fm. (clay units)	16.61	12.24	0.57	2.08	74%
Citronelle Sand (clay units)	22.73	19.80	1.29	3.92	87%
Hattiesburg Fm. (sand units)	97.53	48.48	0.79	2.04	50%
Citronelle Sand (sand units)	290.35	260.88	2.58	9.95	90%

Table 1.-- Measures of central tendency and dispersion for median diameter data from sand and clay units, Citronelle and Hattiesburg formations.

Sand units in the Citronelle are seen to possess average median diameters three times as large as those from the Hattiesburg. Similarly, the average median diameter of grains from clay units within the Citronelle

VARIATION IN MEDIAN DIAMETER FOR HATTIESBURG CLAY UNITS



VARIATION IN MEDIAN DIAMETER FOR CITRONELLE CLAY UNITS

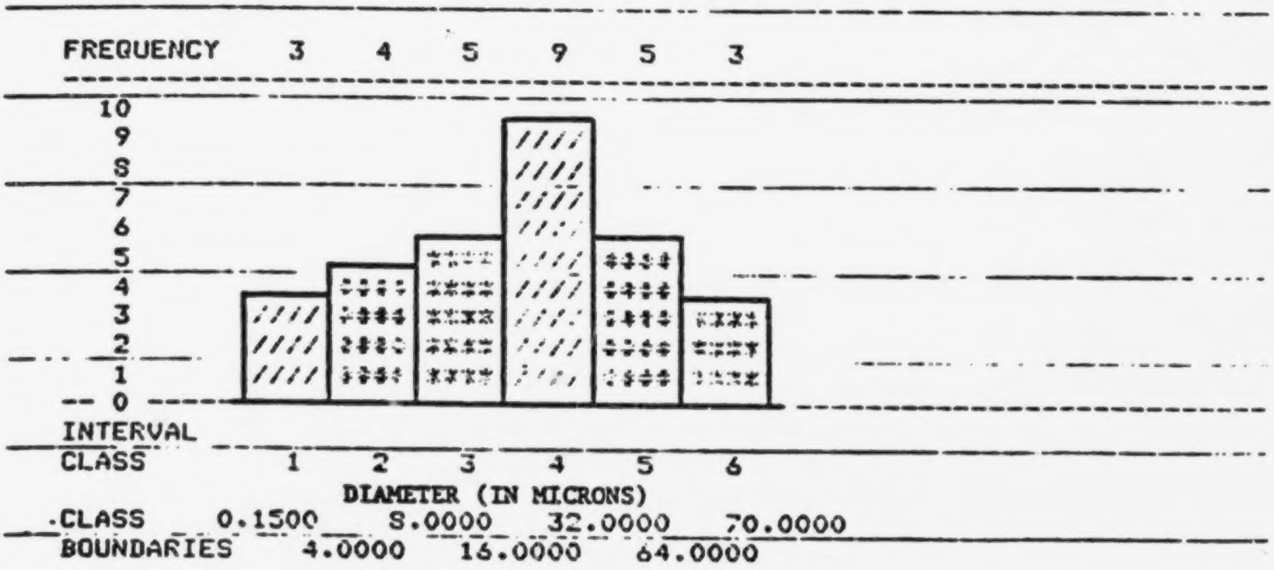
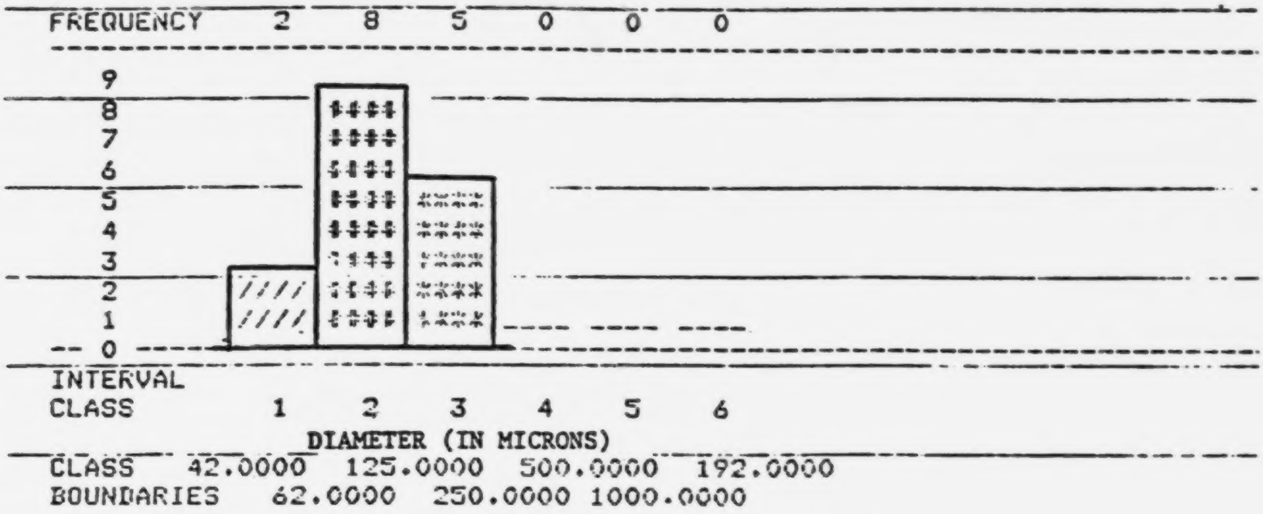


Figure 1.-- Variations in median diameters (extracted from cumulative frequency curves) for Hattiesburg-Citronelle clay and sand units.

VARIATION IN MEDIAN DIAMETER FOR HATTIESBURG SAND UNITS



VARIATION IN MEDIAN DIAMETER FOR CITRONELLE SAND UNITS

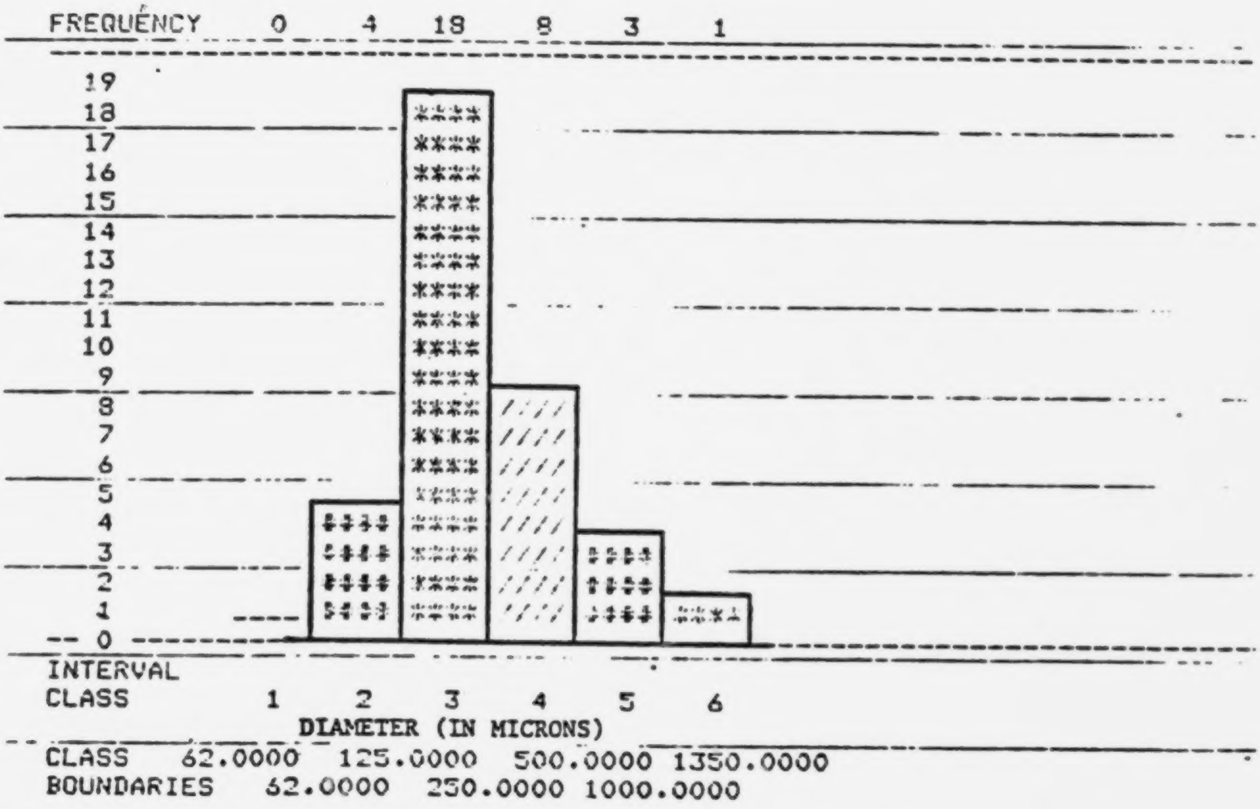


Figure 1 (cont.)

were again found to be larger than those from Hattiesburg samples. Unfortunately, however, the large standard deviations (and coefficients of variation) associated with Citronelle sand and clay units would not, in most cases, allow any one sample to be definitely assigned to either formation. This conclusion was confirmed, statistically, by analysis of variance tests carried out on the data matrix. It should be noted, though, that no samples from the Hattiesburg Formation were found to possess median diameters greater than 250 microns. Hence, from the standpoint of field identification, any sample observed to consist largely of medium or coarse sand could be assigned to the Citronelle Sand with a high degree of certainty. Samples consisting dominantly of fine sand or very fine sand could belong to either unit.

Clay Mineral Analyses

Clay mineral data for 39 samples from the Citronelle and Hattiesburg formations are summarized in Table 2 and Figures 2 and 3.

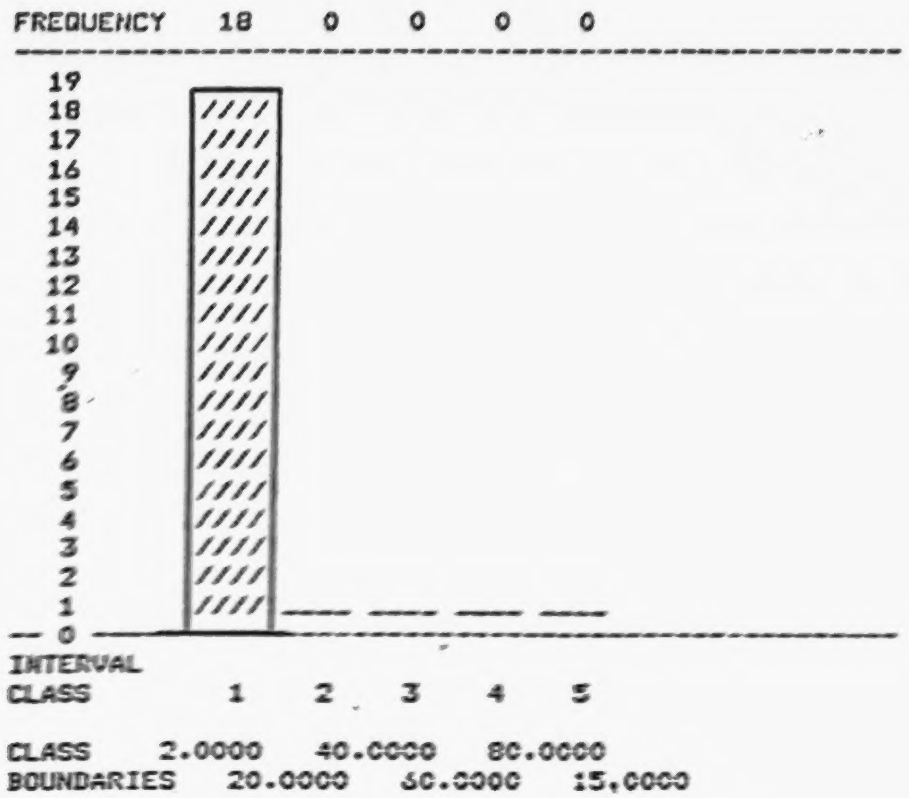
Citronelle Formation	Mean (in %)	Standard Deviation	Skewness	Kurtosis	Coefficient of Variation
Montmorillonite	45.79	30.95	0.14	1.51	68%
Illite	26.79	17.75	1.07	3.19	66%
Kaolinite	27.43	21.33	0.78	2.36	78%
Hattiesburg Formation					
Montmorillonite	84.33	9.45	-0.85	3.06	11%
Illite	10.06	5.96	0.58	2.74	59%
Kaolinite	5.56	4.00	1.17	3.03	72%

Table 2.-- Measures of central tendency and dispersion for clay mineral data from the Hattiesburg and Citronelle formations.

The apparent striking difference in abundances of the three major clay minerals might, at first, seem to provide a rapid means of differentiating the Citronelle from the Hattiesburg. Again, however, large values associated with the standard deviation for the Citronelle clays prevent their un-equivocal use. The Hattiesburg Formation, though, is, on the average, higher in montmorillonite (reflecting its largely marine origin) whereas the Citronelle is higher in kaolinite and illite. Thus, for all practical purposes, samples consisting of moderately high amounts of kaolinite and illite could be assigned to the Citronelle with a relatively high degree of certainty. As seen on Figure 3, however, this would effectively identify approximately half of the Citronelle samples plotted on the diagram and the remainder would fall within the range observed for most Hattiesburg clays.

The large amount of montmorillonite present in Citronelle clays (46%) was unexpected because the mineral is almost wholly lacking in contemporaneous sediments further east in Alabama (where kaolinite completely dominates the mineral suite). The high percentage of montmorillonite in Richton-Cypress Creek Citronelle clays must therefore indicate that either: (1) the Mississippi Citronelle sediments were not derived from the re-working of older Coastal Plain units, as was the Citronelle in Alabama or (2) they have been subjected to considerably less diagenetic alteration that might transform the primary montmorillonitic clays to kaolinite by the method outlined by Altschuler, et al (1963). In view of the fact that the present Tombigbee River in Alabama carries a clay mineral suite not unlike that found in Richton-Cypress Creek Citronelle samples, it is probable that the observed differences between Alabama-Mississippi Citronelle clays arise

KAOLINITE VARIATION -- HATTIESBURG FORMATION



KAOLINITE VARIATION -- CITRONELLE FORMATION

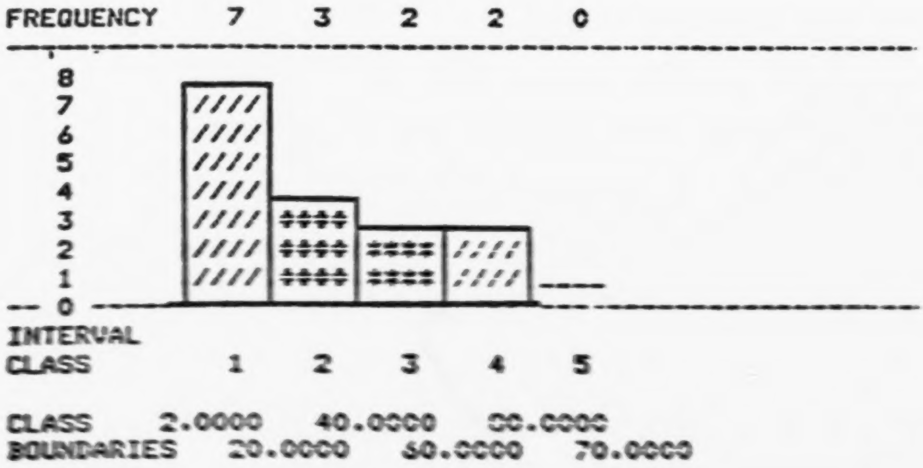
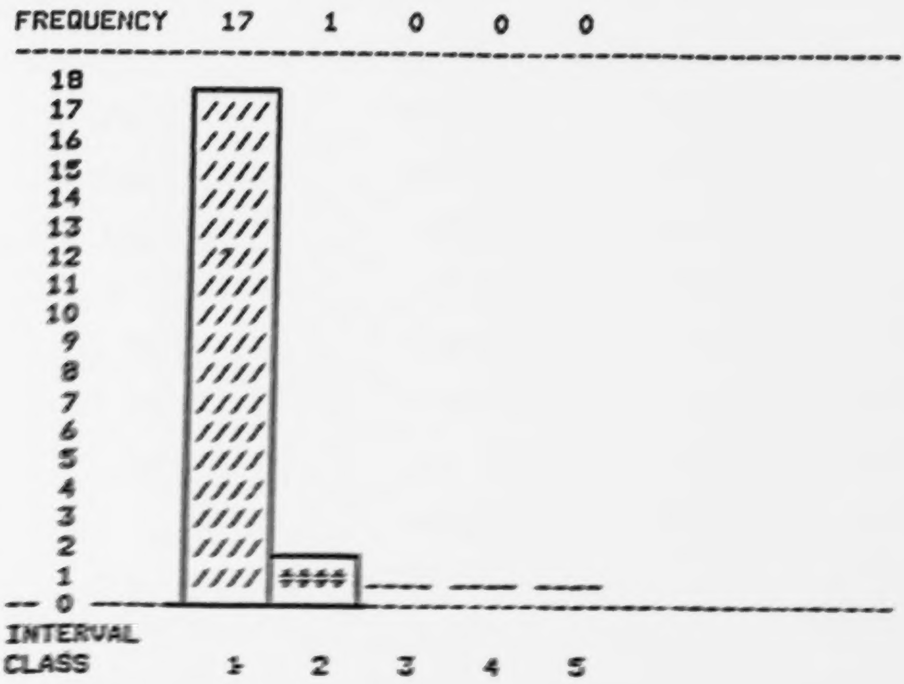


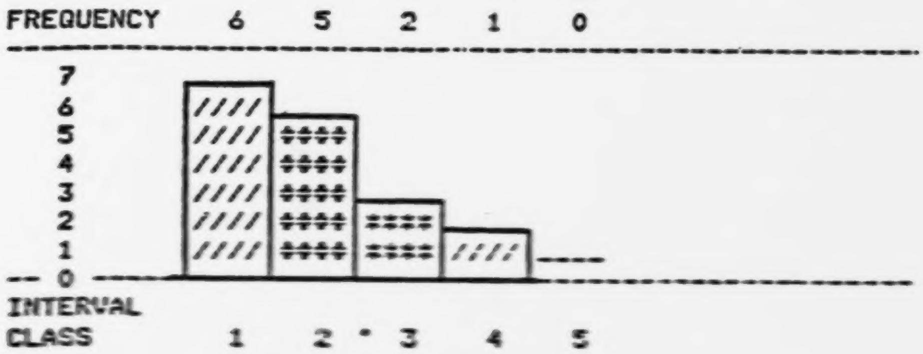
Figure 2.-- Variation in Montmorillonite-Illite-Kaolinite content for samples from the Hattiesburg and Citronelle Formations.

ILLITE VARIATION -- HATTIESBURG FORMATION



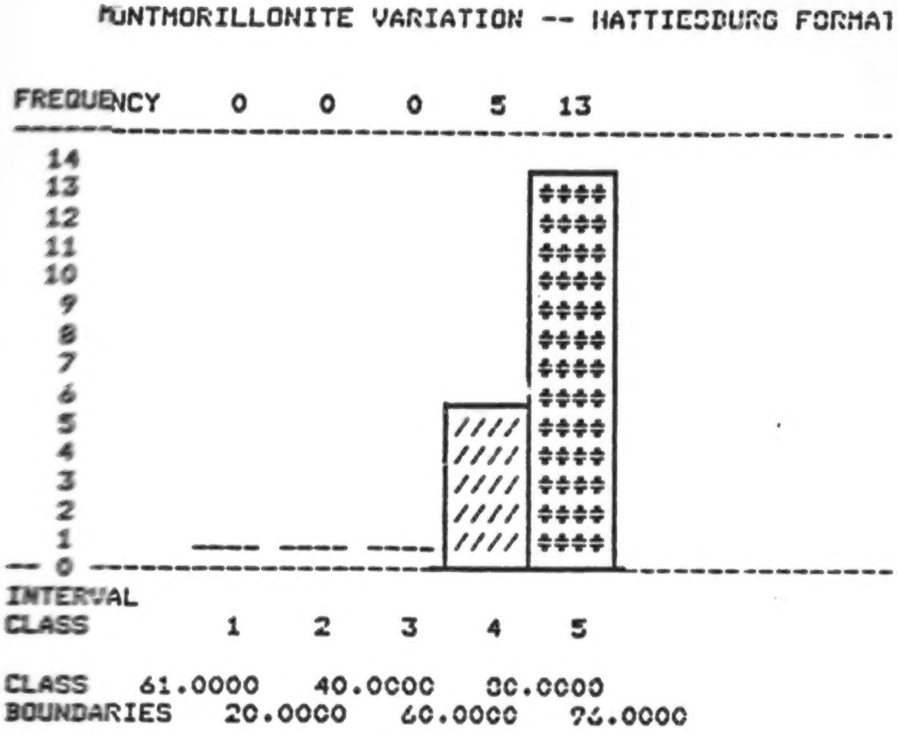
CLASS 2.0000 40.0000 80.0000
BOUNDARIES 20.0000 60.0000 24.0000

ILLITE VARIATION -- CITRONELLE FORMATION



CLASS 7.0000 40.0000 80.0000
BOUNDARIES 20.0000 60.0000 40.0000

Figure 2 (cont.)



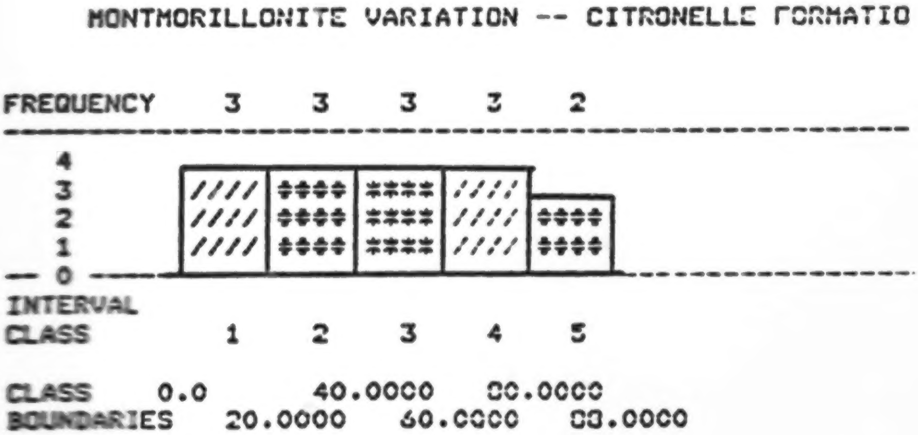
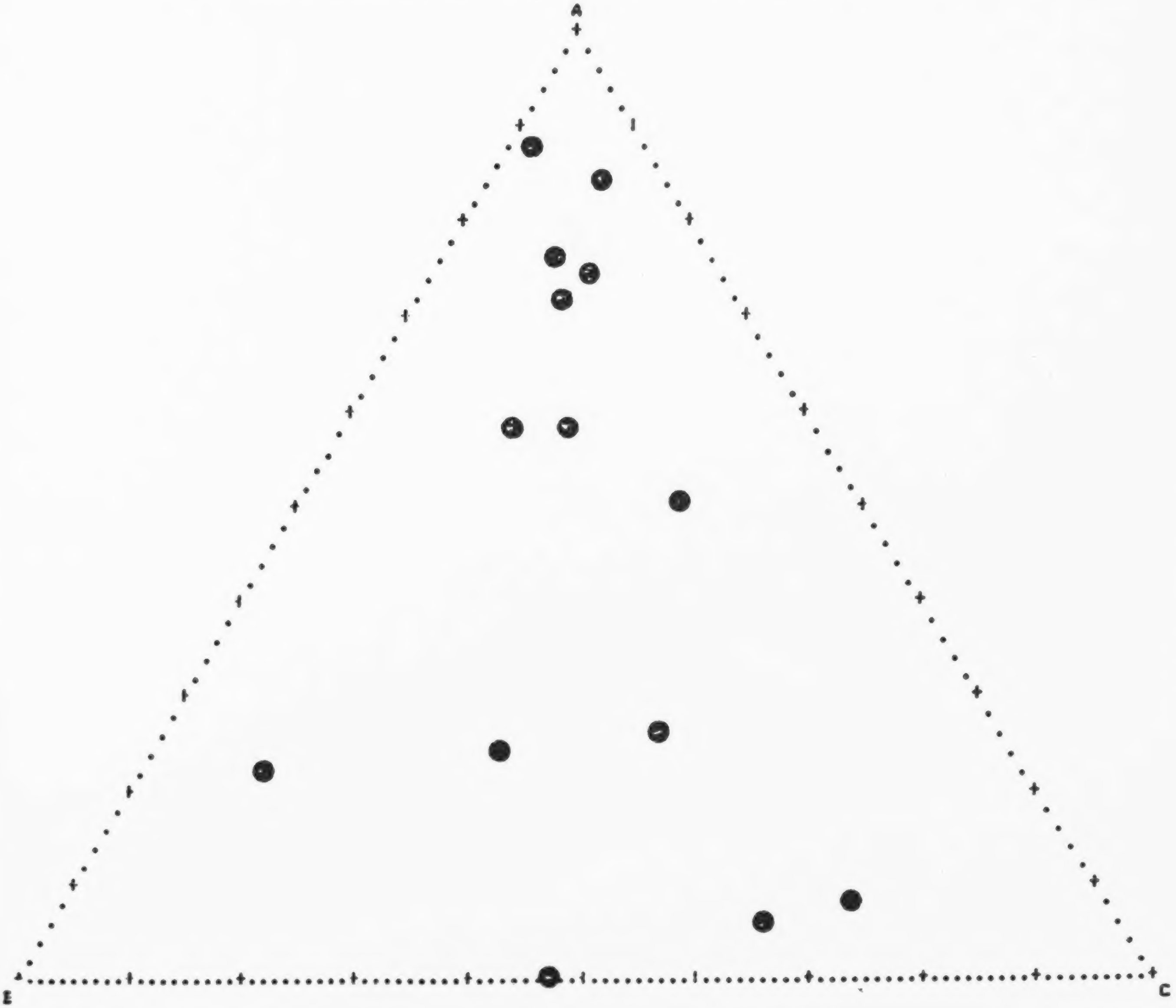


Figure 2 (cont.)

Figure 3

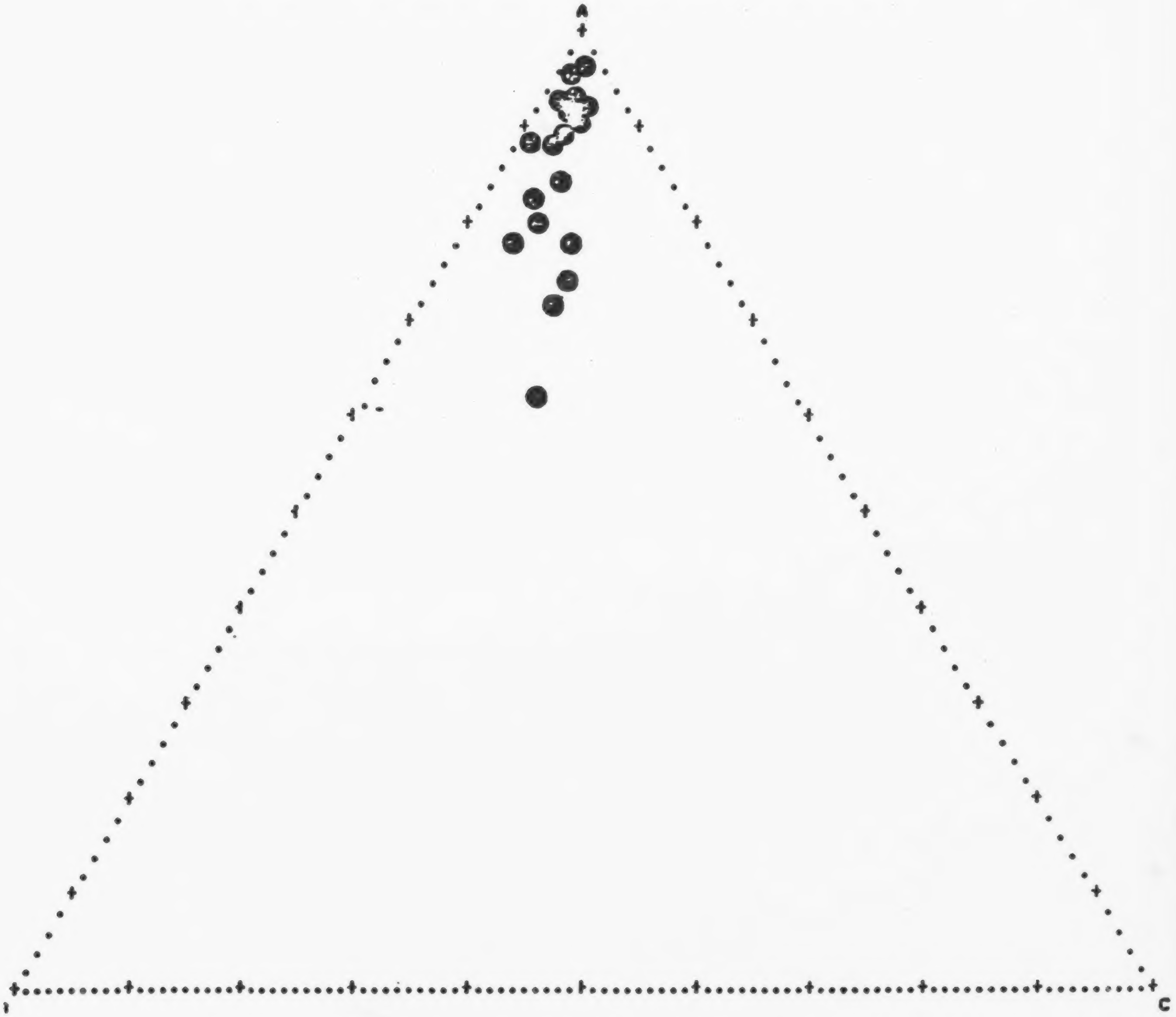
MONTMORILLONITE-ILLITE-KAOLINITE RATIOS FOR CITRONELLE CLAYS



A = MONTMORILLONITE, B = ILLITE, C = KAOLINITE

Figure 3 (cont.)

MONTMORILLONITE-ILLITE-KAOLINITE RATIOS FOR HATTIESBURG CLAYS



A = MONTMORILLONITE, B = ILLITE, C = KAOLINITE as a consequence of their provenance.

Heavy Mineral Analyses

Percentages of heavy minerals present in sand and clay units of the Hattiesburg and Citronelle formations are included as Appendix I. The percentages listed in the tables contain only those mineral species that were present in amounts that experience has shown could possibly allow differentiation of the two units. Minerals such as corundum, monazite, clino-zoisite, diopside, sphene, anatase, etc., were observed in some slides (and are noted on the original data sheets) but were omitted from statistical analysis and inclusion in the tables because of their sparse occurrence.

Summary statistics for those minerals that comprised over 99 percent of each sample are presented in Table 3. Histograms for all common species (those normally present in amounts greater than one percent) are included as Appendix II.

Examination of Table 3 illustrates well the problem frequently encountered when heavy minerals are used as a basis for identifying units of differing geologic age. Mean (average) differences, while outwardly appearing to provide a reasonable basis for separating the different formations, can be wholly mis-leading. Differentiation of the Citronelle from the Hattiesburg, at first, might seem possible based simply on the large difference in the average kyanite content (13% versus 6%). Examination of the values obtained for the standard deviation for Citronelle kyanite counts, however, shows that the use of this criterion would present problems. Thought the Citronelle _on the average_ does possess more kyanite than the Hattiesburg, a significant number of Citronelle samples from the Cypress Creek area contain amounts that would fall within the modal class for Hattiesburg

Table 3

SUMMARY STATISTICS, CITRONELLE-HATTIESBURG FORMATIONS

	Andalusite	Epidote	Garnet	Hornblende	Kyanite	Pyrite	Rutile	Sillimanite	Staurolite	Tourmaline	Zircon	Ilmenite	Leucoxene	Tan Opaques
HATTIESBURG FORMATION, RICHTON DOME														
Sample Mean	1.21	0.0	0.03	0.0	8.43	38.29	0.85	0.46	5.15	6.91	1.29	14.92	16.12	6.67
Sample Standard Deviation	3.01	0.0	13.07	0.0	2.63	1.50	5.14	4.49	2.44	2.05	7.85	6.21	8.42	6.01
CITRONELLE FORMATION, RICHTON DOME														
Sample Mean	0.63	0.0	0.16	0.0	15.35	0.04	2.80	1.07	11.11	10.94	3.69	23.79	15.15	11.25
Sample Standard Deviation	0.72	0.0	0.25	0.0	8.64	0.11	2.29	1.43	5.56	5.57	2.52	13.07	8.87	7.63
HATTIESBURG FORMATION, CYPRESS CREEK DOME														
Sample Mean	1.22	3.34	1.33	0.59	6.04	1.36	1.11	0.56	5.89	14.11	3.39	22.72	23.77	14.31
Sample Standard Deviation	1.07	2.51	2.18	0.99	3.38	4.94	0.96	0.71	3.50	5.78	3.51	13.46	13.80	11.00
CITRONELLE FORMATION, CYPRESS CREEK DOME														
Sample Mean	1.02	0.06	0.44	0.04	12.76	1.23	1.22	0.49	7.91	12.65	1.74	25.03	23.88	11.61
Sample Standard Deviation	0.65	0.21	1.22	0.20	8.50	6.75	0.92	0.45	4.94	6.01	1.99	13.68	15.22	12.81

samples. Examination of the histograms for other minerals included in Appendix II shows that this problem is, by no means, restricted to kyanite.

Therefore, to develop a method that would allow effective identification of the two units with an acceptable degree of certainty, the investigator turned to the statistical procedure of Discriminant Analysis. This technique is discussed at length in a number of excellent texts (see Davis, 1973; Cooley and Lohnes, 1971) and has been successfully used to identify similar clastic units elsewhere in the Gulf Coastal Plain (Isphording, 1976). The mathematics and philosophy of Discriminant Analysis are discussed in each of the aforementioned references and need not be belabored here. Suffice to say that the "power" and chief advantage of a Discriminant Analysis arises from the fact that the criteria used to differentiate two (or more) groups are developed by simultaneously examining the magnitude and "scatter" of each variable for all samples within any one group (in this case, a formation) and then identifying combinations of those variables that will permit any one group to be differentiated from another. The procedure results in each sample being assigned a discriminant "score" which is plotted on the discriminant function (line) and represents a "weighting" of the percentages of the different minerals present. The score may thus be considered as a simple linear combination of the values obtained when the original variables (mineral species) are transformed into a single "new" variable. This new or "transformed" variable represents the sample's position on the discriminant function having the equation:

$$D = d_1X_1 + d_2X_2 + d_3X_3 + \ldots\ldots\ldots + d_nX_n$$

where D is the discriminant score on the discriminant function line, the d's are the weighted coefficients and the X's are the values of the "n" variables (heavy mineral species) used in the analysis.

Analytical Results

Cypress Creek.-- The results of the discriminant analysis applied to the Cypress Creek Dome area are summarized in Table 4 and in Figure 4. Information for evaluating the relative importance of each variable (mineral species) is shown in the column entitled "Percent Added". The figures in this column show the relative percentage that each mineral contributed toward separating (i.e., "discriminating") the two formations. A positive sign indicates that the variable acted to separate the units whereas a negative sign signifies that this species had a significant amount of variability in one (or both) formations and therefore acted to "associate" (draw together) the two formations. The table discloses that epidote, tan opaques, tourmaline and zircon serve to best differentiate Citronelle and Hattiesburg sediments in this area. The effectiveness with which these variables allow the two units to be identified can be assessed by the magnitude of the Mahalanobis D^2 statistic shown on the table. A large value indicates that the variables provide "good" discriminating ability whereas a small value means that too much scatter is associated with the mineral species used. The discriminating "power" is further tested by means of a simple F-test. A null hypothesis is set up to the effect that "there is no discriminating ability, using the variables included in the analysis". This is equivalent to stating that the average discriminant score of group 1 (the Hattiesburg Formation) is equal to the average discriminant score of group 2 (the Citronelle Sand), or, "$D_1 = D_2$". If the calculated F-statistic (4.59 in this case) exceeds the tabulated value (2.70) obtained from standard T-tables, the null hypothesis is "rejected" and the conclusion is drawn that the variables

	Variable	Percent Added
1.	Andalusite	7.23
2.	Epidote	193.57
3.	Garnet	18.24
4.	Hornblende	22.26
5.	Kyanite	-162.07
6.	Pyrite	3.39
7.	Rutile	-4.28
8.	Sillimanite	-0.21
9.	Staurolite	-52.33
10.	Tourmaline	38.44
11.	Zircon	29.36
12.	Ilmenite	-59.44
13.	Leucoxene	-2.90
14.	Tan Opaques	68.75

Calculated F-Statistic = 4.59

$F_{(.01,4,30)} = 2.70$

Mahalanobis $D^2 = 9.54$ ($D_1 = 253.59$, $D_2 = 244.05$)

Table 4.--Discriminant analysis comparing Citronelle-Hattiesburg mineralogy at Cypress Creek (14 variables)

	Variable	Percent Added
1.	Epidote	91.21
2.	Hornblende	7.47
3.	Tourmaline	1.32

Calculated F-Statistic = 17.63

$F_{(.01,3,41)} = 4.31$

Mahalanobis $D^2 = 46.31$ ($D_1 = 15.56$, $D_2 = 61.87$)

Table 5.--Discriminant analysis comparing Citronelle-Hattiesburg mineralogy at Cypress Creek (3 variables)

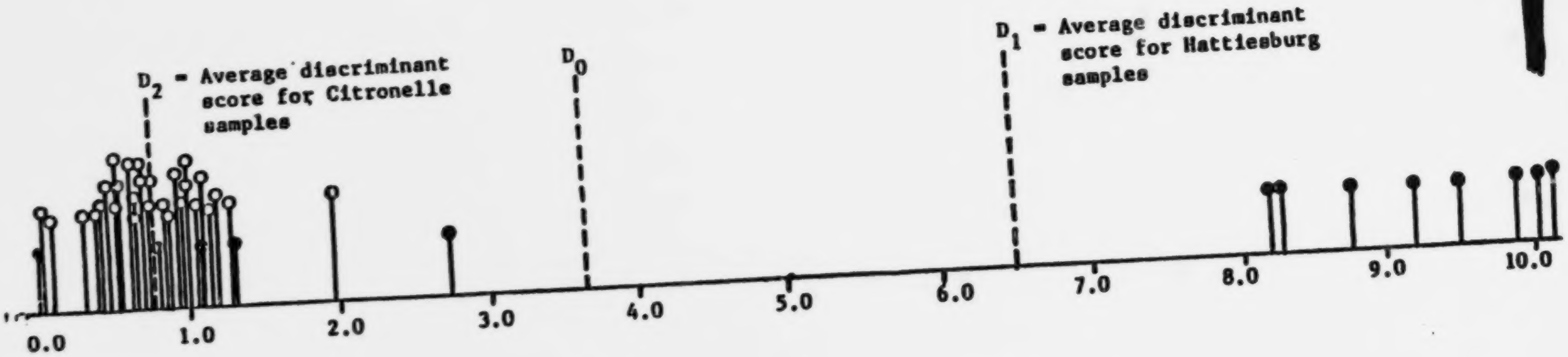


Table 5.-- Discriminant scores of Citronelle (open circles) and Hattiesburg (closed circles) plotted on discriminant function line. Cypress Creek Dome.

do allow the two groups to be identified.

Because of the large number of "associating" variables seen on Table 4 (those with negative signs), a certain amount of "masking" occurs which must be removed in order to determine the true magnitude and importance of the discriminating mineral species. When the associating variables are removed from the data matrix, the analysis reduces to that shown in Table 5. The table shows that the only true discriminating variables are epidote, hornblende and tourmaline, with the latter two contributing less than 10 percent toward differentiating the two formations. Thus, the analysis has indicated that the best means of identifying the two formations in the Cypress Creek area lies in determining whether or not epidote is present in the heavy mineral fraction. If so, the unit is the Hattiesburg Formation, if not, the Citronelle Sand. The large Mahalanobis D^2 and large calculated F-statistic indicate that there is considerably "less than one chance in 100" of mis-identifying the two formations using this criterion.

Richton.-- Similar tables showing the best discriminators and relative effectiveness in identifying the Citronelle and Hattiesburg formations in the Richton area are presented in Table 6 (and Figure 5). With all associating variables removed, the discrimination of the two units is seen to depend largely upon the identification of pyrite, andalusite and tourmaline in the heavy mineral suite. Pyrite contributes 58% toward discrimination (averaging 38% in the Hattiesburg and only trace amounts in the Citronelle) and, if it is absent in both units, the formations can be differentiated by differences in andalusite and tourmaline content. Again, the calculated F-value indicates that there is less than one chance in one-hundred of mis-identifying the sample, using these criteria.

Variable	Percent Added
1. Andalusite	16.81
2. Pyrite	58.47
3. Sillimanite	2.53
4. Tourmaline	5.90
5. Zircon	15.32
6. Leucoxene	0.97

Calculated F-Statistic = 5.50

$$F_{(.01,6,23)} = 3.71$$

Mahalanobis $D^2 = 5.35$ $(D_1 - 4.80,\ D_2 = 0.55)$

Table 6.--Discriminant analysis comparing Citronelle-Hattiesburg mineralogy at Richton (6 variables)

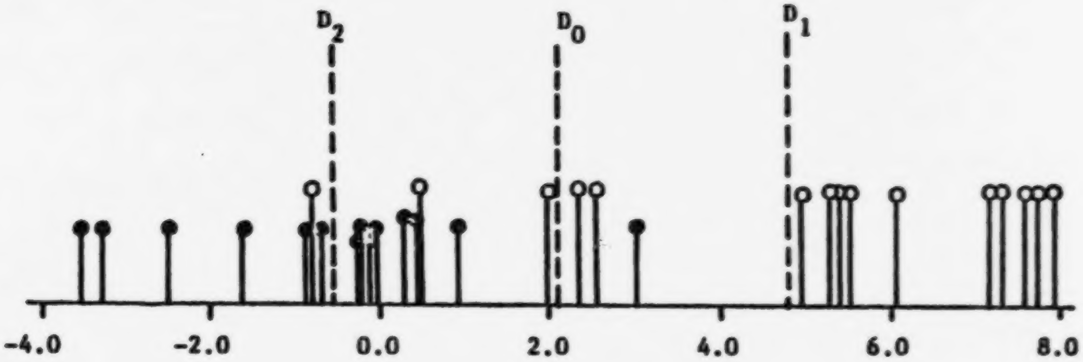


Table 6.-- Discriminant scores of Citronelle (open circles) and Hattiesburg (closed circles) plotted on discriminant function line. Richton Dome.

SUMMARY AND CONCLUSIONS

Identification of Citronelle and Hattiesburg sediments in the vicinity of the Cypress Creek and Richton domes can be carried out with a high degree of certainty using the mineralogy of the detrital fraction as a criteria. Though differences were observed between the "light" mineral fraction of the two formations (Hattiesburg sediments are characteristically richer in potash feldspar and albitic plagioclase), the use of these minerals is not advised because their abundance is affected by a number of post-depositional factors (nearness to the surface, proximity to the water table, mean grain size, etc.) Each of these factors may act, singularly or jointly, to remove feldspar by enhancing its transformation to kaolinite. Similarly, the clay mineralogy suffers from a similar dependence on "lack of weathering". As a general rule, the Hattiesburg Formation is richer in montmorillonite and contains less kaolinite and illite than the Citronelle Sand. Some Richton Citronelle samples, however, also contain high montmorillonite, thus this criteria can not be used with certainty.

The heavy minerals, fortunately, were found to possess characteristics that will permit the two units to be identified with a high degree of certainty. Hattiesburg sands and clays in the Cypress Creek area can be identified by the presence of epidote. This mineral, for all practical purposes, is essentially lacking in the Citronelle Formation. The Miocene sediments in the Richton area were derived from different source rocks and, like the Citronelle, lack the mineral epidote. Differentiation of the two units in this area must, therefore, be based on the abundance of the mineral pyrite in the Hattiesburg, versus its near complete absence in the Citronelle. Where pyrite is lacking in both units, identification can be based on the andalusite-tourmaline content.

The striking difference in the mineral content, when Hattiesburg and Richton samples are compared, deserves additional comment. Reference to Appendix I shows that, whereas epidote, hornblende and garnet are common constituents in the Miocene-age sediments in the Cypress Creek area, they are essentially lacking in contemporaneous sediments in the vicinity of Richton. The reason for this difference might be attributed to any one of three possible factors: (1) because epidote, garnet and hornblende are somewhat less resistant to the effects of chemical weathering, they have been removed in the Richton area by intra-stratal solution, (2) the Hattiesburg sediments in the Richton-Cypress Cree areas are not contemporaneous, and one area contains sediments that are, stratigraphically, younger (or older) than the other or (3) the Hattiesburg sediments in the vicinity of the Cypress Creek dome were derived from a different source area than were those at Richton.

Intra-stratal solution does not seem a logical explanation for the mineral differences because strata in both areas appear to have been subjected to the same climatic rigors and should, therefore, have been similarly affected. The possibility that the Hattiesburg sediments in the two areas represent different stratigraphic levels must also be rejected. Samples from deep bore holes (locations 302 and 307) in the Richton area failed to disclose the presence of any epidote-hornblende-garnet bearing sediments, therefore the possiblilty that the Richton sediments represent a stratigraphically higher level can be discounted. Thus the most logical answer is that the two areas received sediments from two different sources. Because the Hattiesburg Formation further east in Alabama is also similar in mineralogy to that observed at Richton, some form of drainage divide between Cypress

Creek and Richton and Cypress Creek and the Alabama border would be required. A possible explanation, therefore, is that some ancestral river system was draining in a southwestwardly direction across central Alabama and southeastern Mississippi. This river may have had its origin in the metamorphic rocks of the Alabama Piedmont (or possibly Georgia or eastern Tennessee) and its terminus in the Gulf of Mexico, in the vicinity of Cypress Creek. The distinctive mineralogy can only be explained by derivation from a source area containing moderate grade (Amphibolite Facies) metamorphic rocks.

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APPENDIX I

HEAVY MINERAL PERCENTAGES FOR SAMPLES FROM THE CITRONELLE AND HATTIESBURG FORMATIONS NEAR THE CYPRESS CREEK AND RICHTON SALT DOMES.

Sequential sample numbers prefacing each analysis on the following pages refer to the LETCO locations
(3 digit number) and depths in feet (2 digit number)

Citronelle Sand, Cypress Creek

1- 112-160
2- 103-10
3- 118-30
4- 112-70
5- 102-50
6- 102-10
7- 111-80
8- 107-40
9- 117-10
10- 119-1
11- 217-120
12- 201-50
13- 110-10
14- 113-10
15- 103-110
16- 229-60
17- 202-30
18- 208-75
19- 218-50
20- 219-40
21- 219-60
22- 219-85
23- 220-50
24- 220-80
25- 230-30
26- 230-100
27- 232-20
28- 232-90
29- 218-15
30- 209-25
31- 201-80

Citronelle Sand, Richton

32- 204-55
33- 208-60
34- 211-35
35- 215-10
36- 217-60
37- 210-15
38- 210-55
39- 209-70
40- 223-10
41- 301-100
42- 202-5
43- 204-5
44- 308-45
45- 205-5
46- 307-10

Hattiesburg Formation, Cypress Creek

47- 102-200
48- 118-60
49- 104-85
50- 211-130
51- 207-180
52- 203-100
53- 119-75
54- 227-81
55- 220-120
56- 201-150
57- 232-120
58- 212-75
58- 115-20
60- 201-25

Hattiesburg Formation, Richton

61- 217-180
62- 217-120
63- 230-160
64- 230-150
65- 205-20
66- 215-100
67- 216-70
68- 219-130
69- 223-120
70- 308-100
71- 203-20
72- 211-90
73- 212-40
74- 227-120
75- 215-70

(Counts for an additional 27 units were also made but, because of too few grains or species, they are considered statistically unreliable)

BEST DOCUMENT AVAILABLE

[redacted]

	SILLIMANITE	STAUROLITE	TOURMALINE	ZIRCON	ILMENITE	LEUCOXENE	TAN OPAQUE
1-	0.50	18.50	9.80	0.60	15.50	10.20	8.20
2-	0.60	9.80	14.50	0.60	21.90	8.30	30.50
3-	0.30	5.40	16.40	0.30	15.10	48.20	6.40
4-	0.70	7.70	7.20	5.20	47.20	14.10	4.00
5-	0.80	9.80	11.50	1.10	26.70	26.40	7.90
6-	0.00	1.70	4.00	0.60	4.50	17.00	65.30
7-	1.00	6.30	8.60	1.70	37.20	21.60	15.00
8-	0.20	9.30	7.90	1.40	39.60	19.00	6.90
9-	0.90	12.50	12.50	0.90	26.50	22.20	7.40
10-	0.20	17.30	14.60	1.30	17.50	8.40	9.80
11-	0.00	5.00	23.00	0.00	12.00	10.00	44.00
12-	0.70	13.50	26.70	0.00	12.50	13.90	6.90
13-	0.50	11.70	14.20	3.30	23.40	27.00	5.70
14-	0.50	9.30	17.80	3.00	32.50	10.30	8.20
15-	0.20	10.40	6.10	2.70	43.40	14.10	9.00
16-	1.10	7.70	14.90	2.20	19.30	30.90	8.30
17-	0.00	2.30	13.10	0.60	14.00	55.40	9.70
18-	0.30	2.60	11.00	6.10	23.30	48.10	4.00
19-	0.90	17.20	12.10	0.70	23.30	12.80	8.60
20-	0.00	5.00	15.50	1.90	7.50	39.80	11.80
21-	0.30	6.90	14.30	1.10	38.50	21.40	6.60
22-	2.10	0.00	0.00	0.70	18.10	45.80	16.00
23-	0.30	3.60	9.80	1.60	13.70	15.00	5.60
24-	0.80	8.60	9.70	1.70	40.70	19.10	8.00
25-	0.00	4.30	6.50	2.20	9.80	60.90	7.60
26-	0.00	1.60	2.40	0.80	84.10	7.10	1.60
27-	0.70	8.70	16.10	0.20	16.10	32.00	10.40
28-	0.50	15.60	11.00	1.20	35.10	11.90	5.90
29-	0.80	4.80	19.40	0.00	17.70	36.30	7.30
30-	0.30	5.10	19.60	0.90	23.60	26.90	6.90
31-	0.00	3.10	21.90	9.40	15.60	6.30	6.30

APPENDIX I

HEAVY MINERAL PERCENTAGES FOR 31 SAMPLES FROM THE CITRONELLE FORMATION, CYPRESS CREEK DOME.

	ANDALUSITE	EPIDOTE	GARNET	HORNBLENDE	KYANITE	PYRITE	RUTILE
1-	0.30	0.00	0.20	0.00	34.80	0.00	1.50
2-	0.90	0.00	0.00	0.00	13.00	0.00	0.60
3-	1.00	0.00	0.00	0.00	6.70	0.00	0.30
4-	0.30	1.00	0.20	0.00	10.90	0.00	1.50
5-	0.60	0.00	0.30	0.00	12.40	0.00	2.50
6-	0.60	0.60	0.60	0.00	4.50	0.00	0.60
7-	0.70	0.00	0.00	0.00	7.30	0.00	0.70
8-	0.70	0.00	0.20	0.00	13.90	0.00	0.90
9-	2.00	0.00	0.60	0.00	13.40	0.00	0.60
10-	0.40	0.00	0.20	0.00	27.60	0.00	2.70
11-	1.00	0.00	0.00	0.00	4.00	0.00	0.00
12-	0.30	0.00	0.00	0.00	24.80	0.00	0.70
13-	1.40	0.00	0.00	0.00	11.20	0.00	1.60
14-	1.20	0.00	0.00	0.00	15.20	0.00	2.10
15-	0.70	0.00	0.00	0.00	10.20	0.00	3.20
16-	1.10	0.00	0.00	0.00	13.30	0.00	1.10
17-	1.40	0.00	0.30	0.00	2.90	0.00	0.30
18-	0.90	0.00	0.00	0.00	1.70	0.00	2.00
19-	1.60	0.00	0.20	0.00	21.00	0.00	1.40
20-	0.60	0.00	0.60	0.00	16.80	0.00	0.60
21-	1.10	0.00	0.00	0.00	8.80	0.30	0.80
22-	1.40	0.00	0.00	0.00	16.00	0.00	0.00
23-	1.60	0.30	6.20	0.00	3.60	37.60	1.00
24-	0.60	0.00	0.00	0.00	8.60	0.00	2.20
25-	0.00	0.00	0.00	1.10	5.40	0.00	2.20
26-	0.00	0.00	0.80	0.00	1.60	0.00	0.00
27-	1.70	0.00	0.00	0.00	13.00	0.00	1.00
28-	1.20	0.00	0.00	0.00	14.60	0.00	2.90
29-	1.60	0.00	0.00	0.00	11.30	0.00	0.80
30-	1.50	0.00	0.00	0.00	12.70	0.30	2.10
31-	3.10	0.00	3.10	0.00	34.40	0.00	0.00

APPENDIX I (CONT.)

HEAVY MINERAL PERCENTAGES FOR 31 SAMPLES FROM THE CITRONELLE FORMATION, CYPRESS CREEK DOME.

	SILLIMANITE	STAUROLITE	TOURMALINE	ZIRCON	ILMENITE	LEUCOXENE	TAN OPAQUE
32-	0.00	1.70	6.70	0.00	55.90	17.90	16.80
33-	1.30	10.50	4.60	1.80	29.80	7.40	27.30
34-	0.40	14.80	3.10	4.60	20.90	4.60	26.10
35-	0.80	13.20	8.10	3.50	37.00	14.20	6.70
36-	0.70	11.20	13.30	2.10	19.60	24.50	15.00
37-	5.60	5.60	16.70	5.60	11.10	22.20	0.00
38-	1.10	12.80	10.20	3.90	30.30	20.30	6.30
39-	1.20	7.90	14.60	4.90	29.90	13.40	9.80
40-	0.40	9.00	16.80	2.20	30.00	18.90	9.70
41-	1.20	12.90	7.20	6.00	20.90	6.40	15.90
42-	0.00	25.60	5.70	9.90	10.30	0.60	7.50
43-	0.40	15.00	9.70	5.10	27.30	9.50	5.90
44-	2.60	13.00	14.90	3.20	19.50	20.80	8.40
45-	0.30	8.70	23.50	2.60	13.10	34.60	6.10
46-	0.00	4.80	9.00	0.00	1.20	12.00	7.20

	ANDALUSITE	EPIDOTE	GARNET	HORNBLENDE	KYANITE	PYRITE	RUTILE
32-	0.00	0.00	0.00	0.00	1.10	0.00	0.00
33-	0.00	0.00	0.50	0.00	15.10	0.00	1.50
34-	0.00	0.00	0.00	0.00	21.60	0.20	3.70
35-	0.80	0.00	0.00	0.00	11.60	0.40	3.30
36-	2.30	0.00	0.00	0.00	7.90	0.00	2.80
37-	0.00	0.00	0.00	0.00	27.70	0.00	5.60
38-	0.70	0.00	0.00	0.00	12.50	0.00	1.90
39-	1.80	0.00	0.00	0.00	14.00	0.00	2.40
40-	1.10	0.00	0.00	0.00	12.50	0.00	1.50
41-	0.00	0.00	0.50	0.00	25.10	0.00	3.90
42-	0.20	0.00	0.00	0.00	31.00	0.00	9.10
43-	0.80	0.00	0.20	0.00	22.00	0.00	3.60
44-	0.60	0.00	0.60	0.00	15.60	0.00	0.60
45-	1.20	0.00	0.00	0.00	9.00	0.00	0.90
46-	0.00	0.00	0.60	0.00	3.60	0.00	1.20

APPENDIX I (CONT.)

Heavy mineral percentages for 15 samples from the Citronelle Formation, Richton Dome.

	SILLIMANITE	STAUROLITE	TOURMALINE	ZIRCON	ILMENITE	LEUCOXENE	TAN OPAQUES
47-	1.10	8.60	11.10	8.60	19.10	7.70	19.10
48-	0.00	6.30	15.60	3.10	25.00	18.80	18.80
49-	1.10	2.20	15.60	0.60	7.80	11.20	45.30
50-	0.00	2.20	11.40	12.50	26.10	3.80	10.30
51-	0.30	11.70	9.20	2.60	34.40	16.50	5.00
52-	0.40	4.10	18.80	0.70	22.90	35.10	9.60
53-	0.00	2.60	14.00	2.60	29.80	15.80	27.20
54-	0.50	5.00	11.90	3.40	16.10	39.60	10.30
55-	0.00	10.90	21.20	0.70	13.10	37.20	7.30
56-	0.50	5.10	10.90	5.60	26.00	28.10	9.30
57-	0.00	11.80	17.60	0.50	12.30	42.60	8.30
58-	0.00	3.00	0.00	0.00	60.60	9.10	12.10
59-	2.20	3.20	17.20	4.30	15.10	43.00	2.20
60-	1.70	5.80	23.10	2.30	9.80	24.30	15.60

	ANDALUSITE	EPIDOTE	GARNET	HORNBLENDE	KYANITE	PYRITE	RUTILE
47-	3.10	4.00	8.00	1.70	10.30	0.60	0.00
48-	3.10	0.00	0.00	0.00	6.30	0.00	3.10
49-	0.60	4.50	1.70	0.00	8.40	0.00	0.60
50-	2.20	5.40	1.10	2.70	1.60	18.50	0.50
51-	1.00	4.70	1.20	0.30	10.20	0.00	1.60
52-	1.50	1.10	0.00	0.00	4.40	0.00	1.50
53-	0.00	5.30	0.00	0.00	0.90	0.00	0.90
54-	0.80	4.50	1.10	2.60	2.60	0.00	1.10
55-	0.70	0.00	0.00	0.00	7.30	0.00	1.50
56-	0.70	4.90	3.20	0.50	3.50	0.00	0.70
57-	0.00	0.00	0.00	0.50	5.90	0.00	0.50
58-	0.00	0.00	0.00	0.00	12.10	0.00	3.00
59-	1.10	5.40	0.00	0.00	6.50	0.00	0.00
60-	2.30	6.90	2.30	0.00	4.60	0.00	0.60

APPENDIX I (CONT.)

HEAVY MINERAL PERCENTAGES FOR 14 SAMPLES FROM THE HATTIESBURG FORMATION, CYPRESS CREEK DOME.

	SILLIMANITE	STAUROLITE	TOURMALINE	ZIRCON	ILMENITE	LEUCOXENE	TAN OPAQUES
61-	0.40	11.30	9.50	3.70	38.70	9.70	7.60
62-	0.00	0.30	0.30	0.70	4.80	1.70	2.40
63-	0.30	11.90	14.20	0.70	11.90	8.60	10.30
64-	0.00	0.30	0.90	0.00	3.40	0.00	0.00
65-	0.50	6.40	10.40	0.30	11.70	34.00	27.40
66-	1.70	16.40	12.40	2.40	20.20	7.40	9.50
67-	0.00	1.20	0.20	0.20	0.00	0.20	0.00
68-	0.00	2.50	2.50	0.00	5.00	2.50	12.50
69-	0.40	11.30	9.30	0.40	11.30	5.10	4.20
70-	0.00	4.60	8.80	1.50	5.20	24.20	4.10
71-	0.00	2.30	12.90	8.20	26.00	29.60	6.70
72-	2.40	2.40	0.00	0.00	68.30	4.90	7.30
73-	0.00	0.00	2.10	0.00	6.30	1.40	0.00
74-	0.00	0.90	0.00	0.00	0.00	94.70	0.00
75-	1.20	5.50	20.20	1.20	11.00	17.80	8.00

	ANDALUSITE	EPIDOTE	GARNET	HORNBLENDE	KYANITE	PYRITE	RUTILE
61-	0.40	0.00	0.00	0.00	13.00	1.80	3.10
62-	0.30	0.00	0.00	0.00	0.00	89.40	0.00
63-	0.30	0.00	0.00	0.00	28.50	12.90	0.00
64-	0.00	0.00	0.00	0.00	0.30	95.10	0.00
65-	0.80	0.00	0.00	0.00	7.40	0.00	1.10
66-	2.60	0.00	0.00	0.00	29.20	0.00	4.80
67-	0.00	0.00	0.00	0.00	0.60	97.60	0.00
68-	0.00	0.00	0.00	0.00	0.00	75.00	0.00
69-	0.40	0.00	0.00	0.00	24.90	32.20	0.60
70-	1.00	0.00	0.00	0.00	2.60	47.40	0.50
71-	4.40	0.00	0.50	0.00	2.80	4.40	2.10
72-	4.90	0.00	0.00	0.00	9.80	0.00	0.00
73-	0.00	0.00	0.00	0.00	0.00	90.20	0.00
74-	0.00	0.00	0.00	0.00	0.00	4.40	0.00
75-	3.10	0.00	0.00	0.00	7.40	23.90	0.60

APPENDIX I (CONT.)

Heavy mineral percentages for 15 samples from the Hattiesburg Formation, Richton Dome.

APPENDIX II

Histograms showing the distribution of major heavy mineral species for Citronelle-Hattiesburg samples from Cypress Creek and Richton Dome areas.

```
KYANITE VARIATION, HATTIESBURG FM., CYPRESS CREEK

FREQUENCY     6    5    3    0    0    0    0
-------------------------------------------------
   7         ____
   6        !////!____
   5        !////!####!
   4        !////!####!____
   3        !////!####!****!
   2        !////!####!****!
   1        !////!####!****!____ ____ ____ ____
-- 0 --------------------------------------------
INTERVAL
CLASS         1    2    3    4    5    6    7

CLASS    0.9000   10.0000   20.0000   30.0000
BOUNDARIES   5.0000   15.0000   25.0000   12.1000

KYANITE VARIATION, CITRONELLE FM., CYPRESS CREEK

FREQUENCY     6    5   12    3    2    1    2
-------------------------------------------------
  13                   ____
  12                  !****!
  11                  !****!
  10                  !****!
   9                  !****!
   8                  !****!
   7         ____     !****!
   6        !////!____!****!
   5        !////!####!****!
   4        !////!####!****!____
   3        !////!####!****!////!____      ____
   2        !////!####!****!////!####!____!////!
   1        !////!####!****!////!####!****!////!
-- 0 --------------------------------------------
INTERVAL
CLASS         1    2    3    4    5    6    7

CLASS    1.6000   10.0000   20.0000   30.0000
BOUNDARIES   5.0000   15.0000   25.0000   34.8000
```

KYANITE

BEST DOCUMENT AVAILABLE

```
     RUTILE VARIATION, HATTIESBURG FM., CYPRESS CREEK

FREQUENCY    2    6    1    3    0    0    2
------------------------------------------------------
   7             ____
   6            !####!
   5            !####!
   4            !####!     ____
   3        ____!####!    !////!          ____
   2       !////!####!____!////!         !////!
   1       !////!####!****!////!____ ____!////!
— 0 --------------------------------------------------
INTERVAL
CLASS        1    2    3    4    5    6    7

CLASS    0.0       1.0000    2.0000    3.0000
BOUNDARIES    0.5000    1.5000    2.5000    3.1000
```

```
     RUTILE VARIATION, CITRONELLE FM., CYPRESS CREEK

FREQUENCY    6    9    4    3    5    3    1
------------------------------------------------------
  10             ____
   9            !####!
   8            !####!
   7        ____!####!
   6       !////!####!          ____
   5       !////!####!____     !####!
   4       !////!####!****!____!####!____
   3       !////!####!****!////!####!****!
   2       !////!####!****!////!####!****!____
   1       !////!####!****!////!####!****!////!
— 0 --------------------------------------------------
INTERVAL
CLASS        1    2    3    4    5    6    7

CLASS    0.0       1.0000    2.0000    3.0000
BOUNDARIES    0.5000    1.5000    2.5000    3.2000
```

RUTILE

[redacted]

```
        LEUCOXENE VARIATION, CITRONELLE FM., CYPRESS CREEK

FREQUENCY        4   12    6    4    3    1    1
-----------------------------------------------------------
   13               ____
   12              ¦####¦
   11              ¦####¦
   10              ¦####¦
    9              ¦####¦
    8              ¦####¦
    7              ¦####¦____
    6              ¦####¦****¦
    5          ____¦####¦****¦____
    4         ¦////¦####¦****¦////¦____
    3         ¦////¦####¦****¦////¦####¦
    2         ¦////¦####¦****¦////¦####¦____ ____
    1         ¦////¦####¦****¦////¦####¦****¦////¦
 -- 0 ------------------------------------------------------
INTERVAL
CLASS            1    2    3    4    5    6    7

CLASS      6.3000    20.0000    40.0000    60.0000
BOUNDARIES     10.0000    30.0000    50.0000    60.9000

        LEUCOXENE VARIATION, HATTIESBURG FM., CYPRESS CREEK

FREQUENCY        3 .  4    2    3    2    0    0
-----------------------------------------------------------
    5               ____
    4          ____¦####¦     ____
    3         ¦////¦####¦____¦////¦____
    2         ¦////¦####¦****¦////¦####¦
    1         ¦////¦####¦****¦////¦####¦____ ____
 -- 0 ------------------------------------------------------
INTERVAL
CLASS            1    2    3    4    5    6    7

CLASS      3.8000    20.0000    40.0000    60.0000
BOUNDARIES     10.0000    30.0000    50.0000    43.0000
```

LEUCOXENE

```
     ILMENITE VARIATION, HATTIESBURG FM., CYPRESS CREEK

FREQUENCY    2    5    5    1    0    0    1    0    0
----------------------------------------------------------------
   6            ____ ____
   5           ¦####¦****¦
   4           ¦####¦****¦
   3       ____¦####¦****¦
   2      ¦////¦####¦****¦____           ____
   1      ¦////¦####¦****¦////¦____ ____¦////¦____ ____
—  0 -----------------------------------------------------------
INTERVAL
CLASS        1    2    3    4    5    6    7    8    9

CLASS    7.8000   20.0000   40.0000   60.0000   80.0000
BOUNDARIES   10.0000   30.0000   50.0000   70.0000   60.6000
```

```
     ILMENITE VARIATION, CITRONELLE FM., CYPRESS CREEK

FREQUENCY    3   12    7    5    3    0    0    0    1
----------------------------------------------------------------
  13            ____
  12           ¦####¦
  11           ¦####¦
  10           ¦####¦
   9           ¦####¦
   8           ¦####¦____
   7           ¦####¦****¦
   6           ¦####¦****¦____
   5           ¦####¦****¦////¦
   4       ____¦####¦****¦////¦____
   3      ¦////¦####¦****¦////¦####¦
   2      ¦////¦####¦****¦////¦####¦               ____
   1      ¦////¦####¦****¦////¦####¦____ ____ ____¦****¦
—  0 -----------------------------------------------------------
INTERVAL
CLASS        1    2    3    4    5    6    7    8    9

CLASS    4.5000   20.0000   40.0000   60.0000   80.0000
BOUNDARIES   10.0000   30.0000   50.0000   70.0000   84.1000
```

ILMENITE

```
     STAUROLITE VARIATION, HATTIESBURG FM., CYPRESS CREEK

FREQUENCY      3    6    2    3    0    0    0
------------------------------------------------------------------
   7               ____
   6              ¦####¦
   5              ¦####¦
   4          ____¦####¦     ____
   3         ¦////¦####¦____¦////¦
   2         ¦////¦####¦****¦////¦
   1         ¦////¦####¦****¦////¦____ ____ ____
-- 0 -------------------------------------------------------------
INTERVAL
CLASS          1    2    3    4    5    6    7

CLASS     2.2000 ·   6.0000   12.0000   18.0000
BOUNDARIES     3.0000    9.0000   15.0000   11.8000
```

```
     STAUROLITE VARIATION, CITRONELLE FM., CYPRESS CREEK

FREQUENCY      5    8    6    6    2    3    1
------------------------------------------------------------------
   9               ____
   8              ¦####¦
   7              ¦####¦____ ____
   6          ____¦####¦****¦////¦
   5         ¦////¦####¦****¦////¦
   4         ¦////¦####¦****¦////¦     ____
   3         ¦////¦####¦****¦////¦____¦****¦
   2         ¦////¦####¦****¦////¦####¦****¦____
   1         ¦////¦####¦****¦////¦####¦****¦////¦
-- 0 -------------------------------------------------------------
INTERVAL
CLASS          1    2    3    4    5    6    7

CLASS     0.0          6.0000   12.0000   18.0000
BOUNDARIES     3.0000    9.0000   15.0000   18.5000
```

STAUROLITE

```
     TOURMALINE VARIATION, HATTIESBURG FM., CYPRESS CR

FREQUENCY    1    1    5    5    2    0
------------------------------------------------------
   6                 ____ ____
   5                !****!////!
   4                !****!////!
   3                !****!////!____
   2       ____ ____!****!////!####!
   1      !////!####!****!////!####!____
-- 0 -------------------------------------------------
INTERVAL
CLASS        1    2    3    4    5    6

CLASS    0.0      10.0000   20.0000   23.1000
BOUNDARIES    5.0000   15.0000   25.0000
```

```
     TOURMALINE VARIATION, CITRONELLE FM., CYPRESS CRE

FREQUENCY    3    8   11    6    2    1
------------------------------------------------------
  12                 ____
  11                !****!
  10                !****!
   9            ____!****!
   8           !####!****!
   7           !####!****!____
   6           !####!****!////!
   5           !####!****!////!
   4       ____!####!****!////!
   3      !////!####!****!////!____
   2      !////!####!****!////!####!____
   1      !////!####!****!////!####!****!
-- 0 -------------------------------------------------
INTERVAL
CLASS        1    2    3    4    5    6

CLASS    0.0      10.0000   20.0000   26.7000
BOUNDARIES    5.0000   15.0000   25.0000
```

TOURMALINE

```
     ZIRCON VARIATION, HATTIESBURG FM., CYPRESS CREEK

FREQUENCY    5    5    2    0    2
----------------------------------------------------------------
   6        ____ ____
   5       ¦////¦####¦
   4       ¦////¦####¦
   3       ¦////¦####¦____      ____
   2       ¦////¦####¦****¦    ¦####¦
   1       ¦////¦####¦****¦____¦####¦
-- 0 -----------------------------------------------------------
INTERVAL
CLASS        1    2    3    4    5

CLASS    0.0       4.0000     8.0000
BOUNDARIES   2.0000     6.0000     12.5000

     ZIRCON VARIATION, CITRONELLE FM., CYPRESS CREEK

FREQUENCY   23    5    1    1    1
----------------------------------------------------------------
  24        ____
  23       ¦////¦
  22       ¦////¦
  21       ¦////¦
  20       ¦////¦
  19       ¦////¦
  18       ¦////¦
  17       ¦////¦
  16       ¦////¦
  15       ¦////¦
  14       ¦////¦
  13       ¦////¦
  12       ¦////¦
  11       ¦////¦
  10       ¦////¦
   9       ¦////¦
   8       ¦////¦
   7       ¦////¦
   6       ¦////¦____
   5       ¦////¦####¦
   4       ¦////¦####¦
   3       ¦////¦####¦
   2       ¦////¦####¦____ ____ ____
   1       ¦////¦####¦****¦////¦####¦
-- 0 -----------------------------------------------------------
INTERVAL
CLASS        1    2    3    4    5

CLASS    0.0       4.0000     8.0000
BOUNDARIES   2.0000     6.0000     9.4000
```

ZIRCON [redacted]

```
     KYANITE VARIATION, HATTIESBURG RM., RICHTON

FREQUENCY   11    1    3    0    0
------------------------------------------------------
  12       ____
  11      ¦////¦
  10      ¦////¦
   9      ¦////¦
   8      ¦////¦
   7      ¦////¦
   6      ¦////¦
   5      ¦////¦
   4      ¦////¦     ____
   3      ¦////¦    ¦****¦
   2      ¦////¦____¦****¦
   1      ¦////¦####¦****¦____ ____
-- 0 -------------------------------------------------
INTERVAL
CLASS        1    2    3    4    5

CLASS    0.0      20.0000   40.0000
BOUNDARIES   10.0000   30.0000   29.2000
```

```
     KYANITE VARIATION, CITRONELLE FM., RICHTON

FREQUENCY    2    2    4    2    2    2    1
------------------------------------------------------
   5                 ____
   4                ¦****¦
   3       ____ ____¦****¦____ ____ ____
   2      ¦////¦####¦****¦////¦####¦****¦____
   1      ¦////¦####¦****¦////¦####¦****¦////¦
-- 0 -------------------------------------------------
INTERVAL
CLASS        1    2    3    4    5    6    7

CLASS    1.1000   10.0000   20.0000   30.0000
BOUNDARIES    5.0000   15.0000   25.0000   31.0000
```

KYANITE

```
     RUTILE VARIATION, HATTIESBURG FM., RICHTON

FREQUENCY   12   2    1    0    0
--------------------------------------------------
  13        ____
  12       !////!
  11       !////!
  10       !////!
   9       !////!
   8       !////!
   7       !////!
   6       !////!
   5       !////!
   4       !////!
   3       !////!____
   2       !////!####!____
   1       !////!####!****!____ ____
-- 0 ---------------------------------------------
INTERVAL
CLASS        1    2    3    4    5

CLASS    0.0      4.0000    8.0000
BOUNDARIES   2.0000    6.0000    4.8000
     RUTILE VARIATION, CITRONELLE FM., RICHTON

FREQUENCY    7    6    1    0    1
--------------------------------------------------
   8        ____
   7       !////!____
   6       !////!####!
   5       !////!####!
   4       !////!####!
   3       !////!####!
   2       !////!####!____      ____
   1       !////!####!****!____!####!
-- 0 ---------------------------------------------
INTERVAL
CLASS        1    2    3    4    5

CLASS    0.0      4.0000    8.0000
BOUNDARIES   2.0000    6.0000    9.1000
```

RUTILE

```
     LEUCOXENE VARIATION, HATTIESBURG FM., RICHTON

FREQUENCY   10    1    2    1    0    0    1
-----------------------------------------------------
  11       ____
  10      |////|
   9      |////|
   8      |////|
   7      |////|
   6      |////|
   5      |////|
   4      |////|
   3      |////|     ____
   2      |////|____|****|____               ____
   1      |////|####|****|////|____ ____|////|
-- 0 -------------------------------------------------
INTERVAL
CLASS        1    2    3    4    5    6    7

CLASS    0.0     20.0000   40.0000   60.0000
BOUNDARIES  10.0000   30.0000   50.0000   94.7000

     LEUCOXENE VARIATION, CITRONELLE FM., RICHTON

FREQUENCY    5    5    4    1    0    0    0
-----------------------------------------------------
   6       ____ ____
   5      |////|####|____
   4      |////|####|****|
   3      |////|####|****|
   2      |////|####|****|____
   1      |////|####|****|////|____ ____ ____
-- 0 -------------------------------------------------
INTERVAL
CLASS        1    2    3    4    5    6    7

CLASS    0.6000  20.0000   40.0000   60.0000
BOUNDARIES  10.0000   30.0000   50.0000   34.6000
```

LEUCOXENE

```
     ILMENITE VARIATION, HATTIESBURG FM., RICHTON

FREQUENCY    7    4    2    1    0    0    1    0    0
--------------------------------------------------------------
   8       ____
   7      |////|
   6      |////|
   5      |////|____
   4      |////|####|
   3      |////|####|____
   2      |////|####|****|____           ____
   1      |////|####|****|////|____ ____|////|____ ____
-- 0 ---------------------------------------------------------
INTERVAL
CLASS        1    2    3    4    5    6    7    8    9

CLASS    0.0      20.0000   40.0000   60.0000   80.0000
BOUNDARIES   10.0000   30.0000   50.0000   70.0000   68.3000
```

```
     ILMENITE VARIATION, CITRONELLE FM., RICHTON

FREQUENCY    1    5    5    3    0    1    0    0    0
--------------------------------------------------------------
   6            ____ ____
   5           |####|****|
   4           |####|****|____
   3           |####|****|////|
   2       ____|####|****|////|     ____
   1      |////|####|****|////|____|****|____ ____ ____
-- 0 ---------------------------------------------------------
INTERVAL
CLASS        1    2    3    4    5    6    7    8    9

CLASS    1.2000   20.0000   40.0000   60.0000   80.0000
BOUNDARIES   10.0000   30.0000   50.0000   70.0000   55.9000
```

ILMENITE

```
      STAUROLITE VARIATION, HATTIESBURG FM., RICHTON

FREQUENCY     8    2    1    3    0    1    0    0    0
-----------------------------------------------------------------
   9         ____
   8        ¦////¦
   7        ¦////¦
   6        ¦////¦
   5        ¦////¦
   4        ¦////¦          ____
   3        ¦////¦____     ¦////¦
   2        ¦////¦####¦____¦////¦     ____
   1        ¦////¦####¦****¦////¦____¦****¦____ ____ ____
-- 0 ------------------------------------------------------------
INTERVAL
CLASS         1    2    3    4    5    6    7    8    9

CLASS     0.0         6.0000      12.0000      18.0000      24.0000
BOUNDARIES     3.0000      9.0000      15.0000      21.0000      16.4000
```

```
       STAUROLITE VARIATION, CITRONELLE FM., CYPRESS CREEK

FREQUENCY     1    2    2    3    5    1    0    0    1
-----------------------------------------------------------------
   6                             ____
   5                            ¦####¦
   4                        ____¦####¦
   3              ____ ____¦////¦####¦
   2         ____¦####¦****¦////¦####¦____           ____
   1        ¦////¦####¦****¦////¦####¦****¦____ ____¦****¦
-- 0 ------------------------------------------------------------
INTERVAL
CLASS         1    2    3    4    5    6    7    8    9

CLASS     1.7000      6.0000      12.0000      18.0000      24.0000
BOUNDARIES     3.0000      9.0000      15.0000      21.0000      25.6000
```

STAUROLITE

```
           TOURMALINE VARIATION, HATTIESBURG FM., RICHTON

FREQUENCY    7    3    4    0    1    0
-----------------------------------------------------------
   8        ____
   7       ¦////¦
   6       ¦////¦
   5       ¦////¦     ____
   4       ¦////¦____¦****¦
   3       ¦////¦####¦****¦
   2       ¦////¦####¦****¦     ____
   1       ¦////¦####¦****¦____¦####¦____
-- 0 ------------------------------------------------------
INTERVAL
CLASS        1    2    3    4    5    6

CLASS    0.0      10.0000   20.0000   20.2000
BOUNDARIES    5.0000   15.0000   25.0000
```

```
           TOURMALINE VARIATION, CITRONELLE FM., RICHTON

FREQUENCY    2    6    4    2    1    0
-----------------------------------------------------------
   7             ____
   6            ¦####¦
   5            ¦####¦____
   4            ¦####¦****¦
   3        ____¦####¦****¦____
   2       ¦////¦####¦****¦////¦____
   1       ¦////¦####¦****¦////¦####¦____
-- 0 ------------------------------------------------------
INTERVAL
CLASS        1    2    3    4    5    6

CLASS    3.1000   10.0000   20.0000   23.5000
BOUNDARIES    5.0000   15.0000   25.0000
```

TOURMALINE

```
          ZIRCON VARIATION, HATTIESBURG FM., RICHTON

FREQUENCY    12    2    0    0    1
-----------------------------------------------------------
   13     ____
   12    !////!
   11    !////!
   10    !////!
    9    !////!
    8    !////!
    7    !////!
    6    !////!
    5    !////!
    4    !////!
    3    !////!____
    2    !////!####!          ____
    1    !////!####!____ ____!####!
-- 0 -------------------------------------------------------
INTERVAL
CLASS          1     2     3     4     5

CLASS     0.0         4.0000     8.0000
BOUNDARIES     2.0000      6.0000     8.2000
```

```
          ZIRCON VARIATION CITRONELLE FM., RICHTON

FREQUENCY     3    6    4    1    1
-----------------------------------------------------------
    7          ____
    6         !####!
    5         !####!____
    4     ____!####!****!
    3    !////!####!****!
    2    !////!####!****!____ ____
    1    !////!####!****!////!####!
-- 0 -------------------------------------------------------
INTERVAL
CLASS.         1     2     3     4     5

CLASS     0.0         4.0000     8.0000
BOUNDARIES     2.0000      6.0000     9.9000
```

ZIRCON

APPENDIX III

TABLES SHOWING RESULTS OF X-RAY DIFFRACTION ANALYSES FOR 42 SAMPLES FROM RICHTON-CYPRESS CREEK AREAS.

NOTE: Clay mineral percentages are not significant to all digits shown and should be interpreted ± 5%

RICHTON

Sample Number	Unit Identification	Montmorillonite	Illite	Kaolinite
212- 40.5	Hattiesburg	75.000	12.500	12.500
201- 5.5	Citronelle	79.592	10.204	10.204
201- 20.5	Citronelle	59.016	32.787	8.197
203- 20.5	Hattiesburg	78.750	12.500	8.750
203- 5.5	Hattiesburg	70.968	21.505	7.527
209- 30.5	Citronelle	62.400	20.000	17.600
210- 10.5	Citronelle	0.000	30.612	69.388
210- 15.5	Citronelle	0.000	55.556	44.444
211- 90.5	Hattiesburg	77.253	15.021	7.725
215- 70.5	Hattiesburg	90.503	2.793	6.704
217-120.5	Hattiesburg	79.592	10.204	10.204
217- 25.5	Citronelle	56.693	27.559	15.748
224- 5.5	Citronelle	58.065	24.194	17.742
227-120.5	Hattiesburg	58.407	13.274	28.319
230-150.5	Hattiesburg	60.674	28.090	11.236
230-159.6	Hattiesburg	0.000	45.455	54.545
301- 40.5	Citronelle	0.000	45.455	54.545
307- 10.5	Citronelle	0.000	25.000	75.000
308- 25.5	Citronelle	0.000	54.054	45.946
308- 10.5	Citronelle	0.000	66.667	33.333

CYPRESS CREEK

Sample Number	Unit Identification	Montmorillonite	Illite	Kaolinite
203- 60.5	Hattiesburg	45.000	25.000	30.000
102- 10.5	Citronelle	0.000	28.302	71.698
103-220.5	Hattiesburg	74.419	19.380	6.202
107- 10.5	Citronelle	0.000	26.316	73.684
111- 20.5	Citronelle	65.693	18.248	16.058
112-120.5	Citronelle	79.817	13.761	6.422
115-120.5	Hattiesburg	68.966	22.989	8.046
115- 20.5	Hattiesburg	90.566	9.434	0.000
118- 10.5	Citronelle	92.647	0.000	7.353
118- 60.5	Hattiesburg	78.049	16.260	5.691
118- 90.5	Hattiesburg	92.537	4.975	2.488
201- 10.5	Citronelle	82.353	9.804	7.843
201-150.5	Hattiesburg	62.264	28.302	9.434
201- 40.5	Citronelle	83.193	8.403	8.403
204-100.5	Hattiesburg	90.517	4.310	5.172
208- 75.5	Citronelle	97.959	0.000	2.041
210- 55.5	Hattiesburg	75.949	18.987	5.063
210-180.5	Hattiesburg	73.846	7.692	18.462
211- 20.5	Citronelle	66.279	23.256	10.465
212- 75.5	Hattiesburg	56.897	34.483	8.621
220-120.5	Hattiesburg	80.851	10.638	8.511
230- 30.5	Citronelle	56.250	31.250	12.500

APPENDIX IV

TABLE SHOWING ACTUAL HEAVY MINERAL COUNTS OF SAMPLES NOT USED IN COMPILING STATISTICAL INFORMATION EITHER BECAUSE TOO FEW SPECIES WERE PRESENT OR BECAUSE HEAVY MINERAL SEPARATION PROVIDED TOO FEW GRAINS FOR ACCURATE COUNTING. NUMBERS IN PARENTHESES ARE THE TOTAL NUMBER OF GRAINS PRESENT ON EACH SLIDE.

Sample No.	Andalusite	Epidote	Garnet	H'blende	Kyanite	Pyrite	Rutile	Sillimanite	Staurolite	Tourmaline	Zircon	Opaques Black	Opaques White	Ta
118-90 (132)					8				3	7		83	18	13
	Black opaques appear to be fragments of organic debris and not the mineral ilmenite													
308-10 (67)					7		2		12	9	2	17	11	7
111-20	Heavy mineral fraction yielded 0.0018 gm...18grains on slide (several fragments of organic debris and quartz)													
212-75	Heavy mineral fraction yielded 0.0011 gms...all organic debris													
107-10 (32)	2	2			2				2	6		7	13	2
210-10 (43)					4			1	5	10	1	10	10	2
210-180 (27)									2	4		10	6	5
210-55 (40)		2			1				3	10	1	8	12	3
201-10 (33)	1		2	1(?)	3				3	7		6	7	3
201-40	Heavy mineral fraction yielded 0.0013 gms. 12 grains on slide...insufficient for counting													
203-60 (32)		2			4	1		1	2	4	4	2		12
	(many biotite grains also present)													
202-30	Slide consisted largely of iron oxide-stained quartz grains, 1 kyanite, 2 black opaques													
201-20 (20)					2		1		3	1		3	8	2
301-40 (60)					18		1		7	2	5	16	4	7

BEST DOCUMENT AVAILABLE

Sample No.	Andalu- site	Epi- dote	Gar- net	H'blende	Kya- nite	Pyrite	Rutile	Silli- manite	Stauro- lite	Tour- maline	Zir- con	Opaques		
												Black	White	Tan
115-120 (27)	2	2			4			1	2	4	1	3	3	5
308-25 (76)					12				6	5	1	26	18	8
204-100 (65)					3		3		3	6		36	8	3
203-4 (57)					3	1			2	14	6	7	18	6
112-120 (44)	1	1	1		5		3	1	5	3	1	18	4	1
118-10 (66)					7		2		4	12		14	21	6
224-5 (44)					6				1	3	4	1	2	27
101-5	Slide consists entirely of iron oxide-coated quartz grains													
201-5 (40)	1				6		1		1	7	2	1	1	20
217-25 (144)					1				2	5		8	13	119
	Slide consists largely of iron oxide-coated quartz grains ("Tan Opaques")													
103-220 (34)	1				1		1		3	7		12	5	4
211-20 (39)					1				1					37
209-30 (56)	1				11		1	1	3	6	1	21	8	3

REPORT OF INVESTIGATION

MINERALOGICAL DIFFERENTIATION OF HATTIESBURG-CITRONELLE UNITS IN VICINITY OF RICHTON AND CYPRESS CREEK SALT DOMES, PERRY COUNTY, MISSISSIPPI

(PHASE II AND PHASE III DATA)

SUBCONTRACT NUMBER 11930, SUPPLEMENTAL AGREEMENT NUMBER 1,
ISSUED TO W. C. ISPHORDING UNDER SUBCONTRACT NO. E-512-00400,
LAW ENGINEERING TESTING COMPANY, MARIETTA, GEORGIA

MINERALOGICAL DIFFERENTIATION OF HATTIESBURG-CITRONELLE UNITS IN VICINITY OF RICHTON AND CYPRESS CREEK SALT DOMES PERRY COUNTY, MISSISSIPPI

PHASE II STUDY

Purpose.-- The purpose of the Phase II investigation was to assign specific "problem samples" to either the Hattiesburg Formation to the Citronelle Formation, based on mineralogical characteristics obtained from the Phase I study. This was done by separating the heavy mineral fraction of the +120 Mesh (125 micron) fraction of each sample in Acetylene Tetrabromide (S.G. = 2.95). Following separation, the heavy mineral fraction was mounted on glass slides using AEROCHLOR 4465 and grain counts were carried out using the procedure described, in detail, in the Phase I report.

Examination of numerous heavy mineral suites from Hattiesburg-Citronelle samples in the Richton Cypress Creek areas established the following criteria for differentiating the units:

RICHTON AREA

Hattiesburg Formation	Citronelle Formation
Possesses abundant Pyrite in the heavy mineral suite. Andalusite more common than in Citronelle Formation (commonly over 1%).	Lacks Pyrite in the heavy mineral suite; tourmaline tends to be abundant (averaging 10% of the heavy mineral fraction).

CYPRESS CREEK AREA

Hattiesburg Formation	Citronelle Formation
Characterized by abundant epidote, garnet and hornblende in the heavy mineral suite; this is a moderate grade metamorphic rock assemblage and reflects a "distant" source (Piedmont) for these sediments.	Totally lacks epidote and hornblende, garnet rare. The lack of these minerals easily differentiates Citronelle samples from the stratigraphically older Hattiesburg units in the Cypress Creek area.

Other differences were observed between Hattiesburg and Citronelle samples between (and within) the two regions but were not considered to be sufficiently diagnostic so as to allow consistent differentiation. Samples from the Citronelle Formation, for example, were usually observed to be of coarser grain size than those from the Hattiesburg. Similarly, Hattiesburg clays were frequently dominated by the mineral Montmorillonite whereas those from the Citronelle contained abundant Kaolinite. A number of exceptions to these differences were observed, however, which limited their usefulness in differentiating the units.

Identification of Problem Samples

The following table lists those samples considered as "questionable" and the unit, and basis, for assignment. Actual counts for each sample are included in the Appendix of this report.

Sample Number	Formation	Basis for Assignment
116-20	Citronelle	Black opaques and zircon similar to those in known Tc (Citronelle) samples
206-110	Hattiesburg	Abundant pyrite
209-75	Citronelle(?)	White opaques only "diagnostic" mineral present
210-110	Citronelle	Textural analysis
217-140	Hattiesburg	Epidote abundant in heavy mineral suite and texture analysis
218-90	Hattiesburg	Presence of abundant carbonized wood fragments, texture analysis plus some pyrite in mineral suite
222-30	Citronelle(?)	Abundance of iron-stained quartz grains in mineral suite

Sample Number	Formation	Basis for Assignment
219-140	(?)	Neither mineralogy nor texture was definitive for this sample
223-15	Citronelle	Abundant black opaques, zircon and rutile; texture analysis also diagnostic for Citronelle
226-50	Hattiesburg	Abundant pyrite in heavy mineral suite
228-20	Citronelle	Abundant leucoxene in mineral suite closely resembles other known samples in Richton area
229-10	Citronelle (or possible Terrace deposit!)	Large median diameter size in texture analysis (also diagnostic ilmenite and zircon)
229-15	Citronelle	Identification based on lack of pyrite in heavy mineral fraction
229-30	Citronelle	Textural analysis (also abundant black opaques and rutile)
229-65	Hattiesburg	Garnet, epidote and pyrite in heavy mineral suite and median grain size of sample were diagnostic
229-80	Hattiesburg	Few heavy minerals were present but the presence of several epidote grains, the small median diameter and the stratigraphic position relative to sample 229-65 was sufficient to establish identity
229-100	Hattiesburg	Sample contained abundant garnet and epidote
230-170	Citronelle	Median grain size combined with presence of iron-stained quartz grains and shiny black ilmenite
230-190	Hattiesburg	Median grain size and relative abundance of andalusite
301-230	Hattiesburg	Presence of hornblende and biotite in heavy mineral suite

Sample Number	Formation	Basis for Assignment
304-30	Hattiesburg	Abundant pyrite was diagnostic for identifying unit
305-160	Citronelle	All quartz grains were heavily iron stained; zircon was abundant and median grain size was "too large" to be Hattiesburg
305-210	Hattiesburg	Pyrite abundantly present in sample
309-160	Citronelle(?)	Grain size indicated sample was from Citronelle Formation; a few grains of hornblende were noted, which are diagnostic of some of the Miocene units. These may be the result of re-working, however

PHASE III INVESTIGATION

The purpose of the Phase III investigation was to clarify the relative stratigraphic position of Miocene samples collected in the vicinity of the Cypress Creek salt dome by examination of the heavy mineral suites in two drill cores from the Richton area (lcoations 302 and 207).

The unusual mineralogy of the Cypress Creek samples (specifically, the presence of a number of moderate-rank metamorphic minerals) and their complete absence in Richton samples could be interpreted as indicating:

(1) the Cypress Creek Miocene samples are younger than those in the Richton area and/or were derived from a different source area

(2) samples collected in the Richton area are stratigraphically younger than those of Cypress Creek and the lack of garnet, epidote, zoisite, etc. in the heavy mineral suite simply indicates that the bore holes did not reach sufficient depth to "penetrate" the units possessing this mineralogy.

Four samples were examined from borehole 302 from depths of 330, 360, 390, and 460 feet. No garnet, epidote, zoisite, nor hornblende was encountered in any of the samples. Pyrite, as in all samples examined in the Phase I and II studies, continued to be the dominant constituent. Similar results were obtained for samples from borehole 307 from depths of 125, 240, 370, 440 and 480 feet (see table in Appendix).

Based on the results of these analyses, it is reasonably certain that the Richton Miocene samples do not lie stratigraphically above units possessing "Cypress Creek" mineralogy. Further, it is doubtful that the Miocene strata in the Cypress Creek area represent sediments of significantly younger stratigraphic position than those in the Richton area. Rather, the striking difference in mineralogy observed between samples from the two areas probably results from a difference in source materials. The moderately high rank metamorphic assemblage observed at Cypress Creek could not have been derived from older Coastal Plain units as such minerals are wholly absent in the Cretaceous and Tertiary sediments. The only conceivable source, therefore, is to hypothesize that they were derived from a major river originating in the southern Piedmont which drained southwestwardly toward a Gulf of Mexico terminus. Such a course has been proposed by others for the ancestral Tennessee River. Uplift taking place in southeastern United States during the late Miocene subsequently altered the course of the Tennessee, resulting in its northerly flow into the Ohio, and was responsible for the entrenchment of a number of other major streams in the southern Alabama-Mississippi Coastal Plain.

TABULATED MINERAL COUNTS FOR PHASE II AND PHASE III SAMPLES (in percent)

SAMPLE NUMBER	EPIDOTE	GARNET	HORNBLENDE	KYANITE	PYRITE	RUTILE	SILLIMANITE
116-20	0	0	0	0	0	0	2.4
206-110	0	0	0	0	97.6	0.6	0
209-75	0	0	0	0	0	0	0
210-110	No Heavy Minerals in +120 Mesh Fraction - Iron Oxide Stained Quartz Only						
217-140	3.9	1.6	0.8	16.5	0	0.8	0
218-90	0	0	7.3	0	4.9	0	0
222-30	No Heavy Minerals in +120 Mesh Fraction - Iron Oxide Stained Quartz Abundant						
219-140	0	0	0	11.3	0	0.9	0
223-15	0	0.5	0	21.2	0	5.1	0
226-50	0	0	0	0.7	97.0	0.7	0
228-20	4.1	0	12.5	8.3	0	0	0
229-10	0.6	0.6	0	0	0	1.9	0
229-15	0	0	0	20.6	0	4.6	0.8
229-30	0	0	0	10.2	0	1.7	0
229-65	5.5	8.8	0	11.1	4.1	1.8	0
229-80	5.9	0	0	17.6	0	0	0
229-100	3.6	6.0	0	18.0	0	1.2	0
230-170	0	0	0.7	9.6	0	0.7	2.2
230-190	4.2	0	0	16.7	0	0	0
301-230	4.3	0	8.7	4.3	0	0	0
304-30	0.8	0	1.6	0	96.8	0	0
305-160	0	0	4.6	17.2	0.7	2.6	0
305-210	0.7	0	10.2	5.1	60.6	0	0
309-160	0.7	0	12.0	9.0	0.8	5.3	0

TABULATED MINERAL COUNTS FOR PHASE II AND PHASE III SAMPLES (in percent) (cont.d)

SAMPLE NUMBER	STAUROLITE	TOURMALINE	ZIRCON	ILMENITE	LEUCOXENE	TAN OPAQUES	NUMBER COUNTED
116-20	9.5	0	11.9	59.5	16.3	2.3	42
206-110	0	0.6	0	0	0	1.2	264
209-75	0	0	0	10.7	82.1	7.1	56
210-110	See above						
217-140	13.4	11.0	1.6	15.0	30.7	4.7	227
218-90	4.9	4.9	0	48.8	21.9	7.3	82
222-30	See above						
219-140	11.3	16.0	2.8	25.5	15.1	17.0	212
223-15	13.6	4.5	9.1	33.8	9.6	2.5	298
226-50	0.7	0	0	0.7	0	0	235
228-20	8.3	0	0	25.0	33.3	8.3	48
229-10	10.3	10.9	3.8	42.9	19.9	8.9	312
229-15	18.3	13.0	1.5	22.1	10.7	8.4	262
229-30	14.1	10.2	1.7	43.5	15.8	2.8	354
229-65	6.9	5.5	8.8	36.9	7.4	3.2	434
229-80	2.9	11.8	0	35.3	23.5	2.9	68
229-100	16.8	13.2	2.4	15.0	20.4	3.6	334
230-170	3.0	12.6	2.2	26.7	37.0	5.2	270
230-190	8.3	12.5	4.2	37.5	16.7	0	48
301-230	4.3	30.4	0	21.7	21.7	4.3	46
304-30	0	0	0	0.8	0	0	252
305-160	9.3	5.3	3.3	44.4	9.3	3.3	302
305-210	3.7	5.1	0.7	7.3	2.9	3.7	274
309-160	12.8	9.0	4.5	24.8	7.5	13.5	266

TABULATED MINERAL COUNTS FOR PHASE II AND PHASE III SAMPLES (in percent) (cont'd.)

SAMPLE NUMBER	EPIDOTE	GARNET	HORNBLENDE	KYANITE	PYRITE	RUTILE	SILLIMANITE
302-330	0	0	0	2.4	87.5	0	0
302-360	0	0	0	2.7	85.6	0.5	0
302-390	0	0	0	1.6	89.3	0	0
302-460	0	0	0	4.3	85.8	0	0
307-125	0	0	0	2.6	79.5	0	0
307-240	0	0	0	1.2	88.5	0.8	0
307-440	0	0	0	3.9	86.6	0.6	0
307-480	0	0	0	4.2	80.4	0.8	0

TABULATED MINERAL COUNTS FOR PHASE II AND PHASE III SAMPLES (in percent) (cont.d)

SAMPLE NUMBER	STAUROLITE	TOURMALINE	ZIRCON	ILMENITE	LEUCOXENE	TAN OPAQUES	NUMBER COUNTED
302-330	0	1.2	2.4	0.6	2.4	3.6	336
302-360	0	3.1	1.1	0	3.2	3.7	376
302-390	0	2.5	0.8	0.8	3.3	1.6	244
302-460	0	5.2	0.7	0.7	3.3	0.5	211
307-125	0	5.2	2.6	1.3	6.1	1.3	229
307-240	0.4	2.4	1.6	0.4	4.3	0.4	253
307-440	0.6	1.7	0.6	0	5.0	1.1	279
307-480	0	6.3	1.7	0.8	5.0	0.8	240

MISSISSIPPI STUDY AREA

APPENDIX B-3

CLAY MINERAL ANALYSIS

Clay samples from the Area Characterization shallow borings in the Richton supradomal area were analyzed by Dr. Charles Weaver of the Georgia Institute of Technology, a consultant to Law Engineering. The purpose of these analyses was to determine if the Hattiesburg and Citronelle Formations could be differentiated on the bases of distinctive clay mineral suites. These analyses preceded the heavy mineral analyses performed by Dr. Isphording (Appendix B-2).

A total of 30 split spoon samples from the "200" and "300 Series" shallow borings and four hand samples were selected and analyzed by x-ray methods. The location of the shallow borings in which samples were analyzed are shown in Figure A-2.2 (Appendix A-2). Surface Samples BGP-1, 2, and 3 were taken from a gravel pit in the SW /NW of Section 25, T5N, R10W. Sample BDC-1 was taken from an outcrop on Beaver Dam Creek in the NE¼/NE¼ of Section 15, T5N, R10W. Eighteen of the samples were from the Hattiesburg Formation and sixteen from the Citronelle Formation according to determinations by Law Engineering geologists.

The samples used in the study were chosen to give a wide range of depths, locations, and clay content. These samples were then sent unprocessed to Dr. Weaver for analysis.

The results of the clay mineral analysis are presented in Table B-3.1. This table was constructed by Law Engineering personnel from data received from Dr. Weaver. Figure B-3.1, constructed by Law Engineering personnel, is a ternary diagram of the data presented in Table B-3.1. This figure shows that the Hattiesburg Formation samples are clustered near the montmorillonite apex, whereas Citronelle samples show a very broad distribution of clay minerals.

Based on the data developed in these analyses, the clays with low amounts of montmorillonite were identified as Citronelle, but the montmorillonite-rich clays could not be assigned positively to either the Citronelle or Hattiesburg Formations.

MISSISSIPPI STUDY AREA

APPENDIX B-3

TABLE B-3.1 (PAGE 1 of 2)

CLAY MINERAL ANALYSES - RICHTON DOME

FORMATION	BORING & SAMPLE NO.	SAMPLE DEPTH	MONTMORILLONITE	ILLITE	KAOLINITE	MISC.
Citronelle	209-4	20.0'	83	7	10	
	209-4	30.0'	71	16	13	K-fld
	210-3	15.0'	6	31	63	
	210-6	25.0'	23	46	31	
	213-3	15.0'	60	16	24	K-fld
	217-5	25'	76	14	10	K-fld
	220-8	40'	58	27	15	K-fld
	220-18	90.0'	31	44	25	K-fld
	224-5	25'	88	10	2	K-fld
	230-2	10'	58	22	20	------
	301-8	40.0'	49	17	34	
	301-12	60.0'	74	12	14	K-fld
	BGP-1*	elev. 240'	8	22	70	
	BGP-2*	elev. 240'	26	30	44	
	BGP-3*	elev. 210'		53	47	
	BDC-1*	elev. 220'	21	68	11	

* Hand Sample

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MISSISSIPPI STUDY AREA

APPENDIX B-3

TABLE B-3.1 (PAGE 2 OF 2)

CLAY MINERAL ANALYSES - RICHTON DOME

FORMATION	BORING & SAMPLE NO.	SAMPLE DEPTH	MONTMORILLONITE	ILLITE	KAOLINITE	MISC.
Hattiesburg	204-10	50'	89	7	4	K-&Na-fld
	204-26	160'	91	6	3	K-&Na-fld
	211-22	120'	77	18	3	K-&Na-fld
	212-12	60'	80	14	6	K-&Na-fld, 2% Chlorite
	212-26	160'	83	11	7	K-&Na-fld
	215-8	40'	88	10	2	K-&Na-fld
	215-13	65'	92	5	3	K-fld
	216-8	40'	90	6	4	K-fld, Pyrite
	216-12	60'	82	13	5	K-fld
	217-22	120'	88	9	3	K-fld
	219-16	80'	73	15	12	K-fld
	222-8	40'	92	4	4	K-fld
	222-12	60'	96	2	2	------
	223-21	110.0'	72	16	12	K-fld
	223-25	150.0'	61	24	15	K-fld
	230-24	140.0'	77	13	10	K-fld, Pyrite
	228-14	70.0'	96	2	2	
	227-3	15.0'	91	6	3	K-fld

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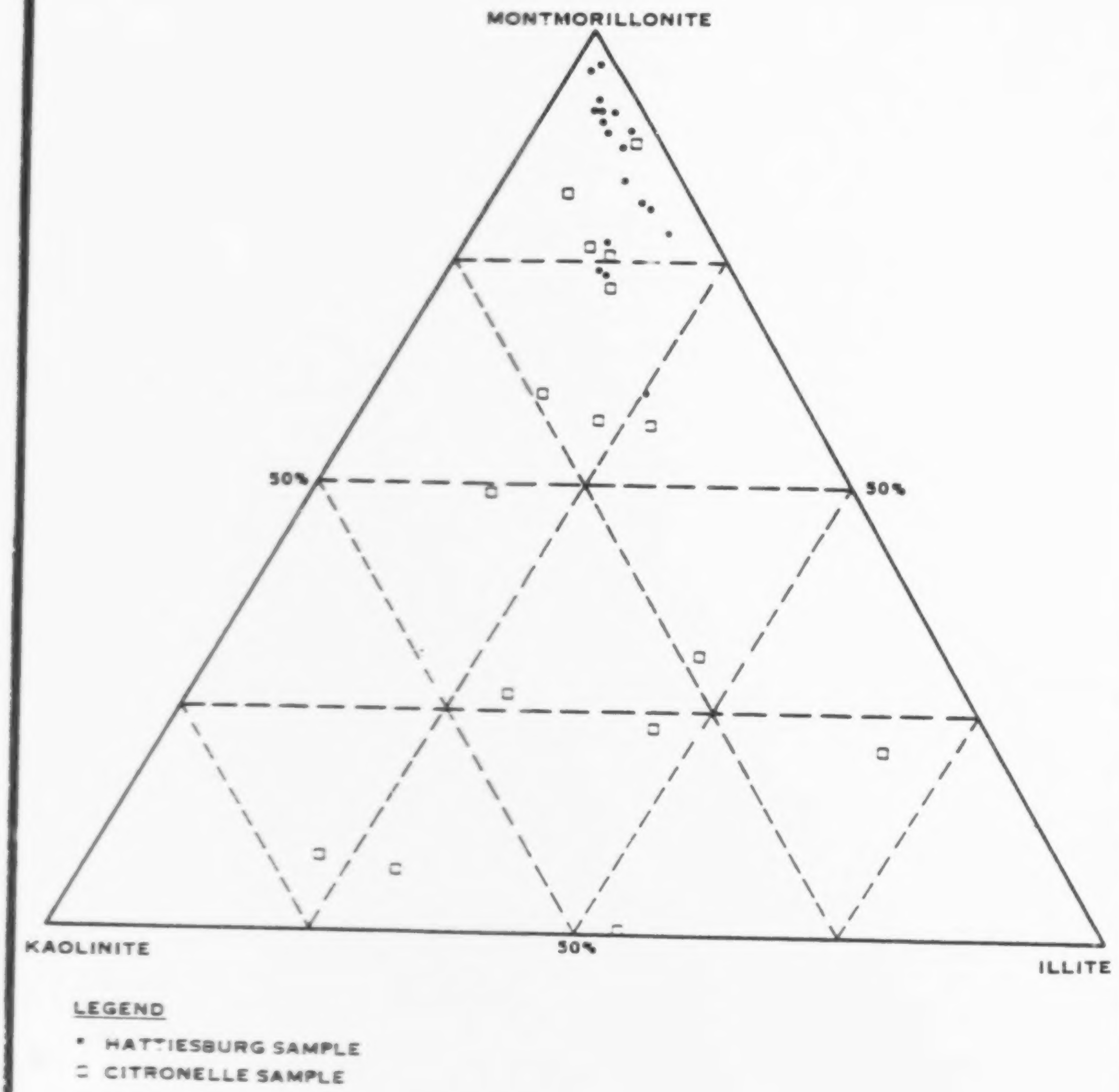

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MISSISSIPPI STUDY AREA
APPENDIX B-3
RICHTON DOME
TERNARY PLOT OF
CLAY MINERAL DATA
JOB NO. MV9700 FIGURE B-3.1

MISSISSIPPI STUDY AREA

APPENDIX B-4

GRAIN SIZE ANALYSIS

Grain size analyses of selected split spoon samples from the Area Characterization shallow borings in the vicinity of Cypress Creek and Richton Domes were performed by Law Engineering. The analyses were performed to provide grain size distribution data as well as sample separation. Upon completion of the grain size analyses, all sample fractions and grain size distribution curves were forwarded to Dr. W. C. Isphording for use in his heavy mineral analyses (Appendix B-2).

Samples were processed using ASTM D 421-58, "Standard Method for Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants" and a procedure modified from ASTM D 422-63, "Standard Method for Particle Size Analysis of Soils". The modifications to ASTM D 422-63 involved the use of sieve sizes consistent with the requirements of the heavy mineral analyses. Also, some samples were tested when the required minimum sample size was not recovered. The small sample size was a result of the amount of sample retained in the split spoon.

The samples were sieved through Number 10, 18, 35, 60, 120, and 230 U.S. Standard sieves. The fraction passing through the Number 230 sieve was graded by determining sedimentation rates with a hydrometer.

The results of these grain size analyses are presented here as Tables B-4.1 through B-4.72 for samples from the Cypress Creek domal area, and Tables B-4.73 through B-4.124 for samples from the Richton domal area.

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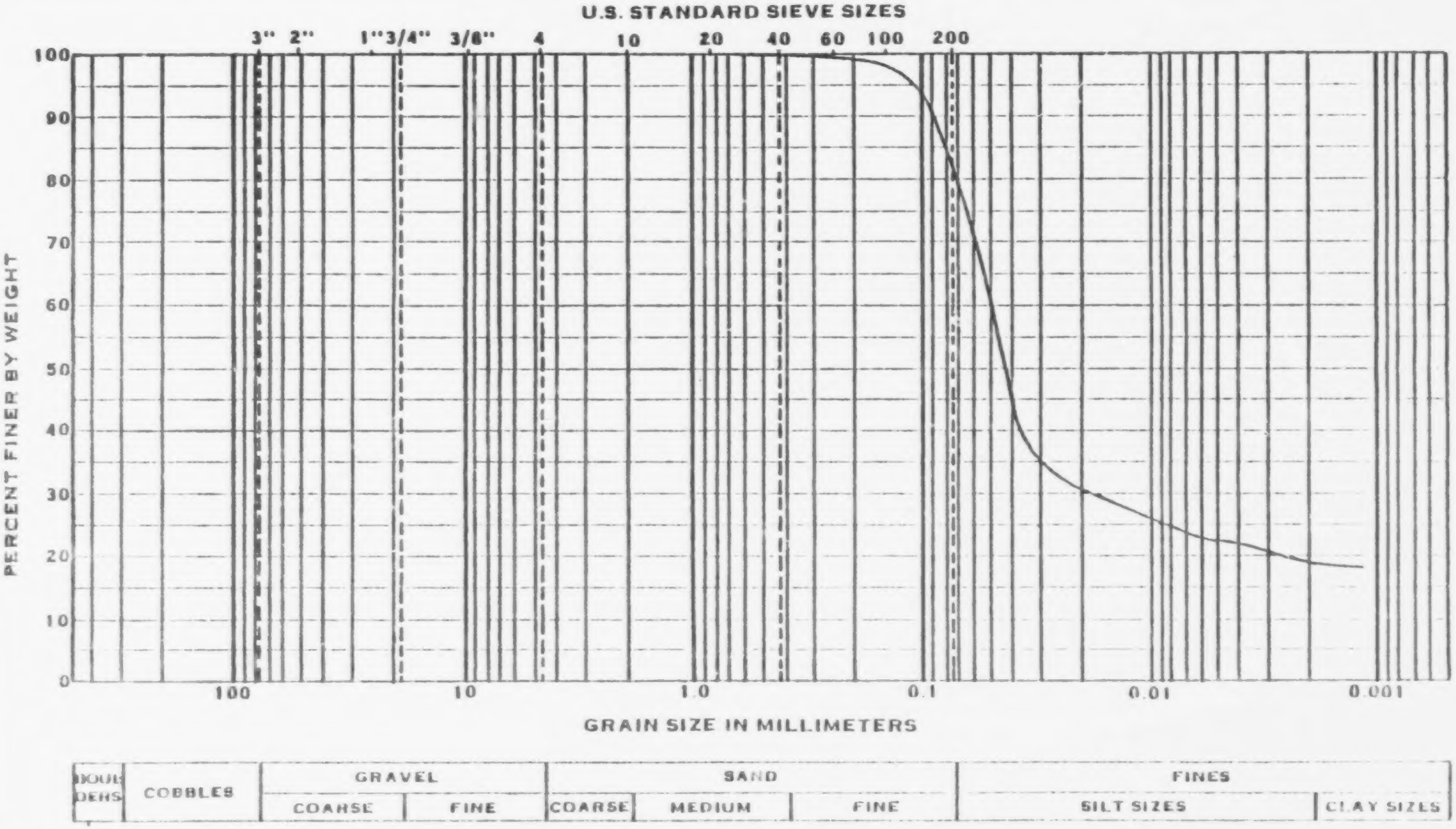

BORING NO	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-101	4' - 5.5'				

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CYPRESS CREEK DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.1

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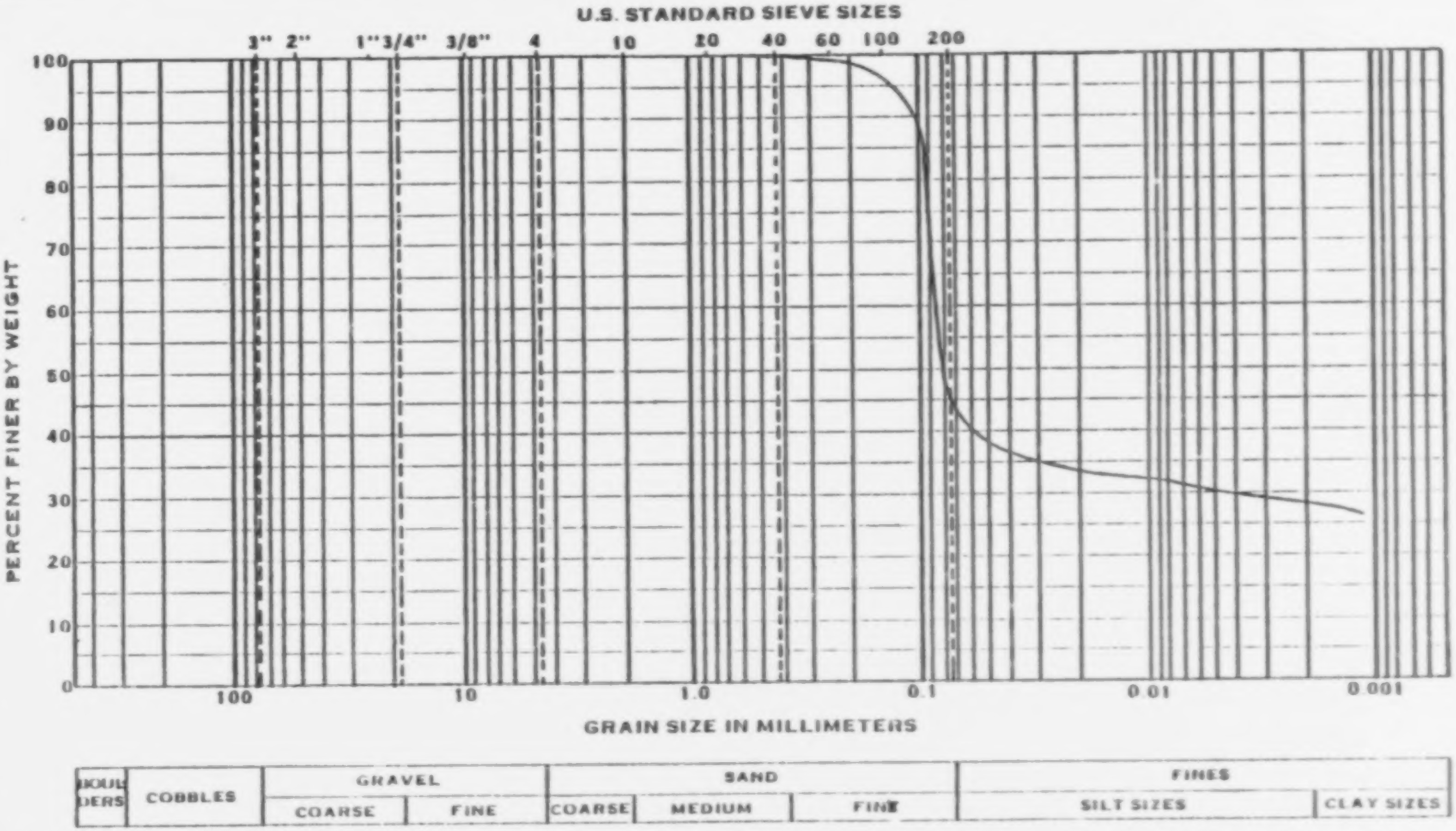

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-102	10'				

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TABLE NO. B-4.2

200

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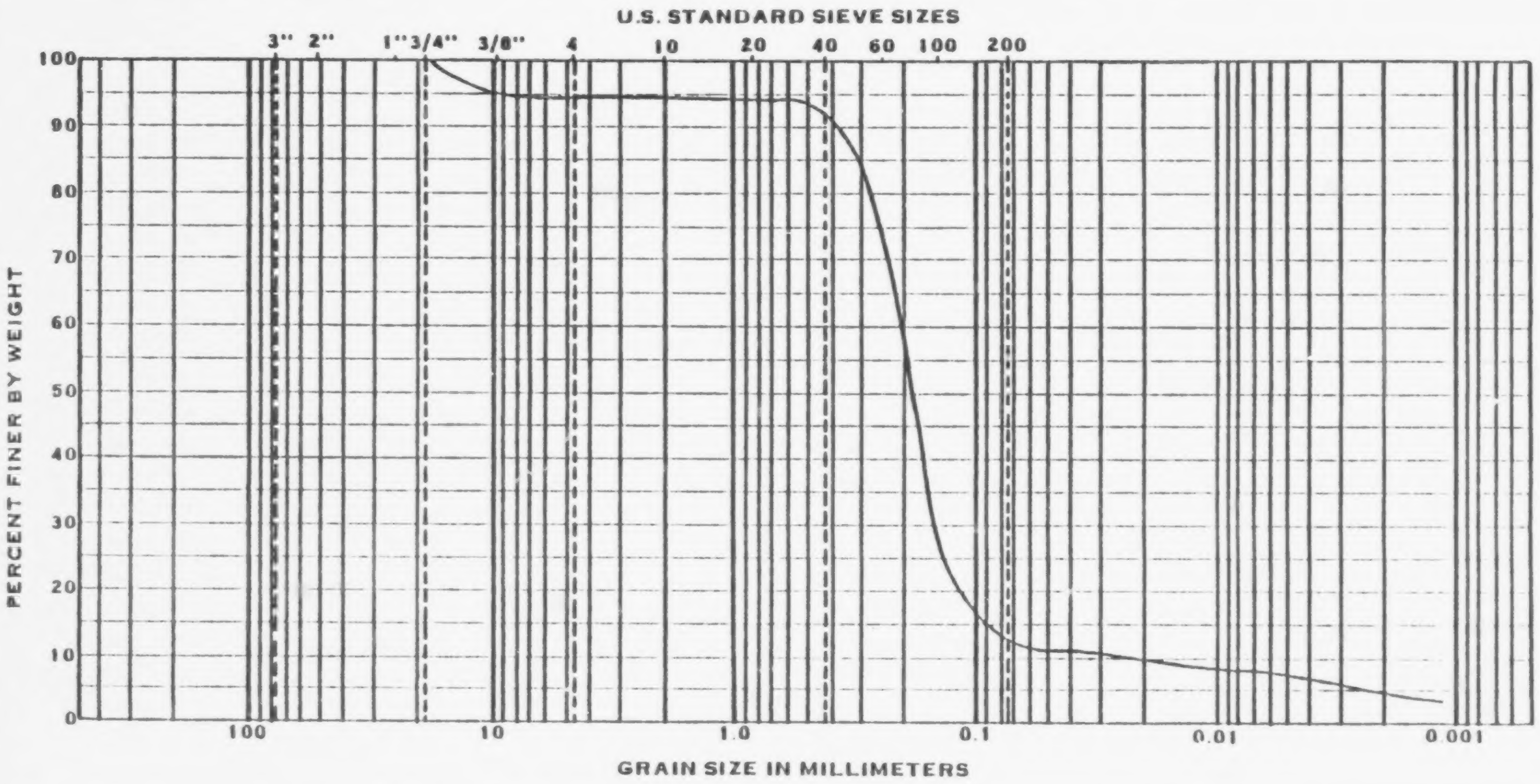

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-102	80'				

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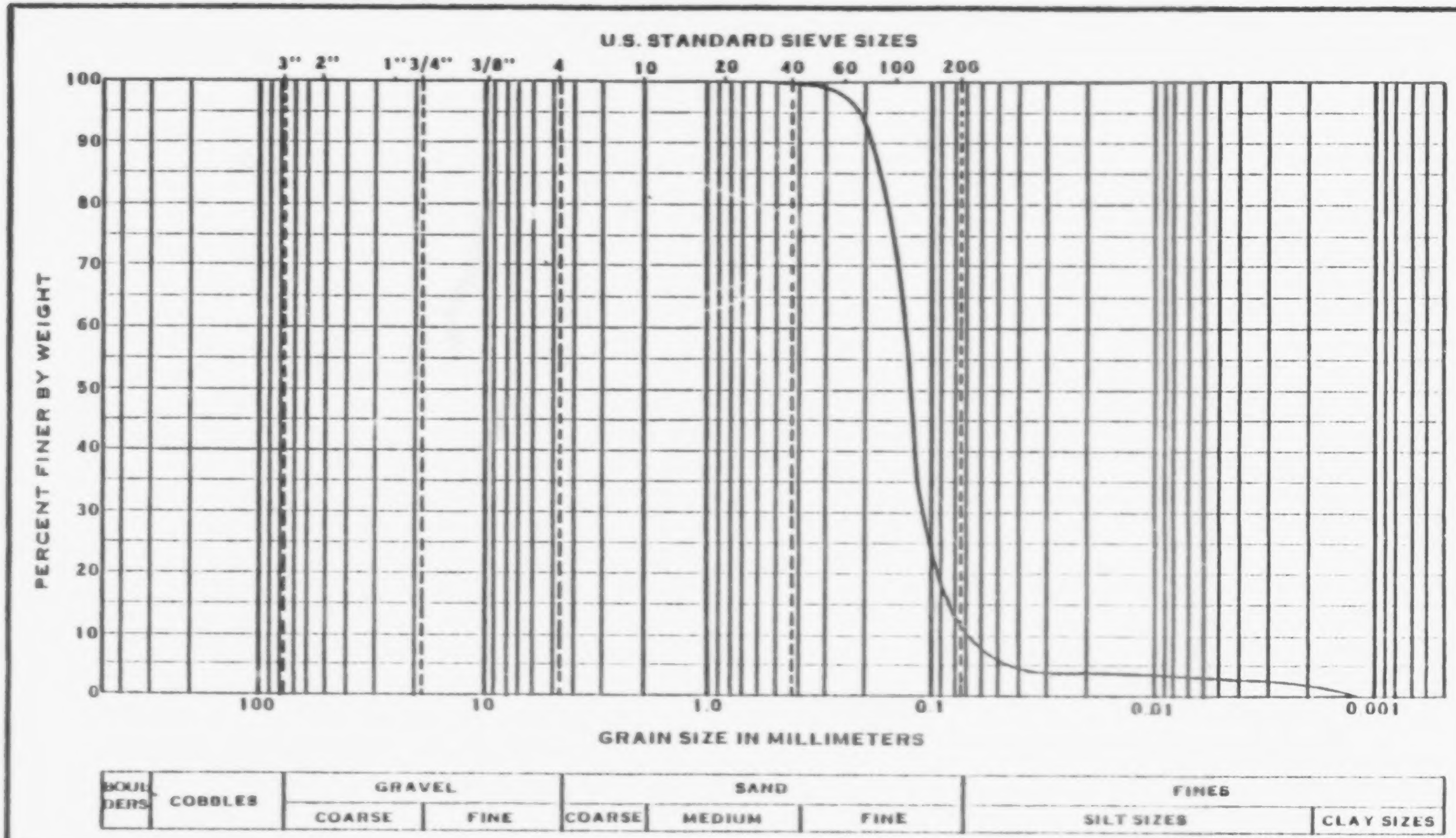
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.3



BORING NO	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-102	200'				

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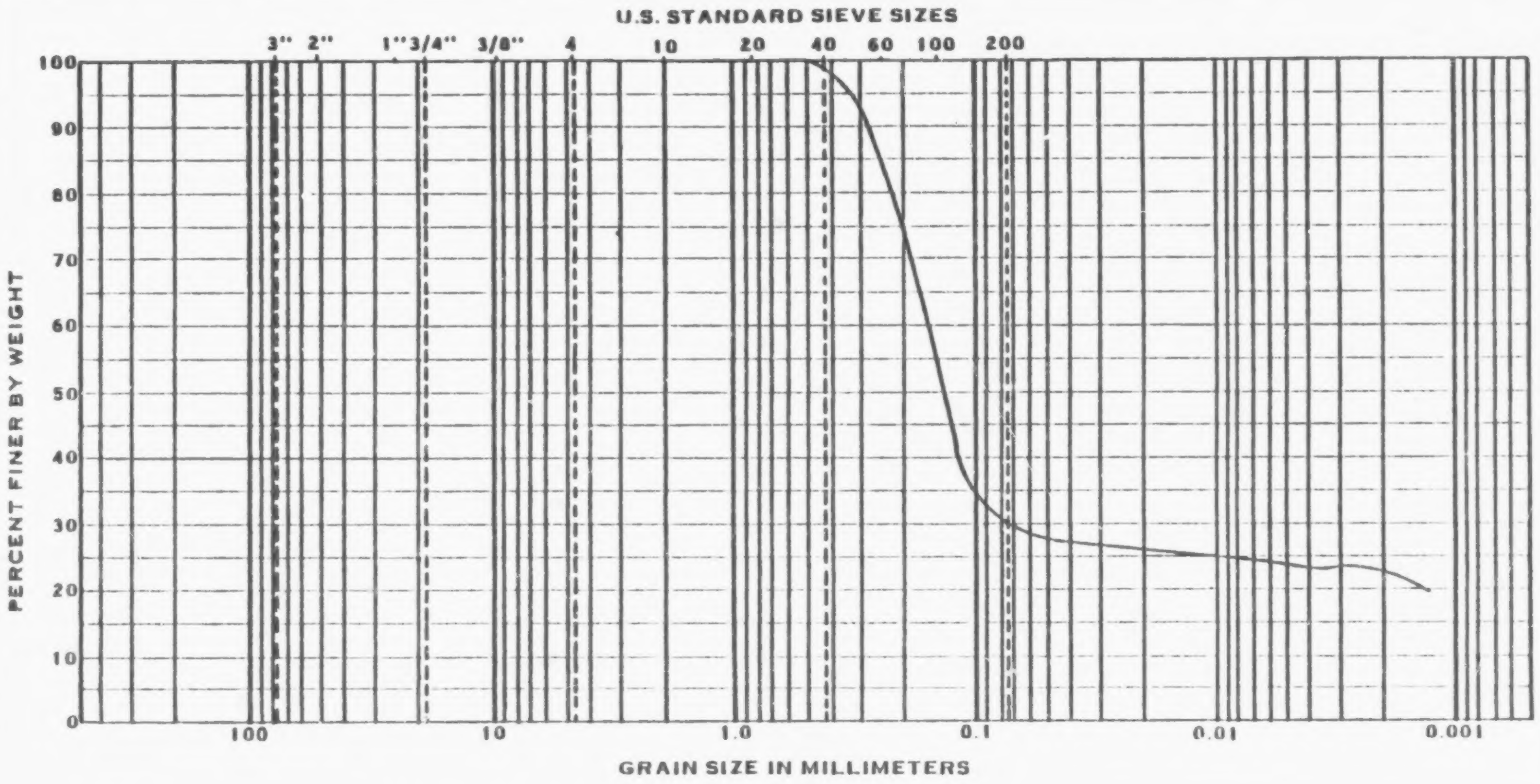
GRAIN SIZE DISTRIBUTION

TABLE NO B-4.4



BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-103	10'				

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TABLE NO. B - 4.5

203

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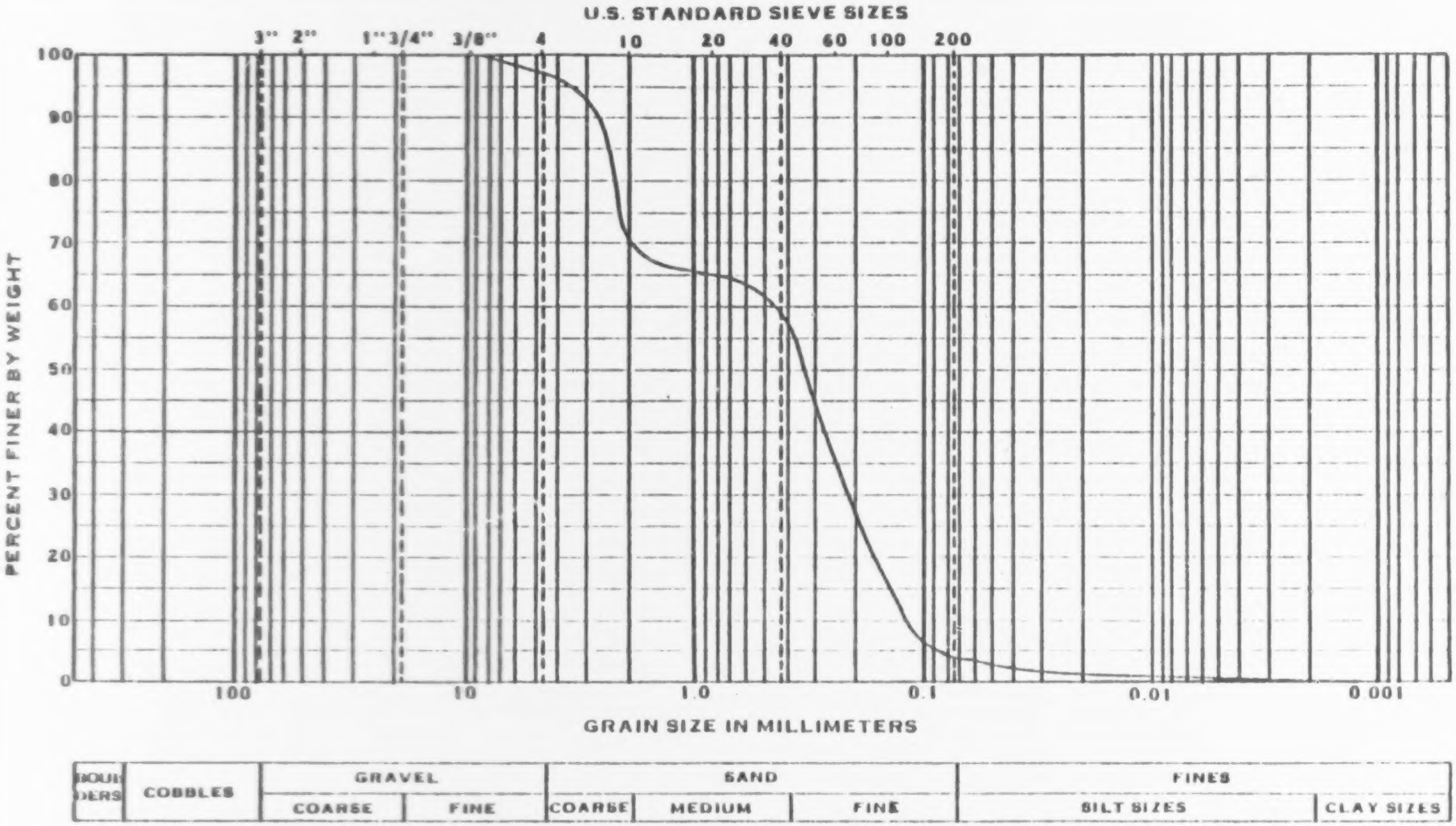

BORING NO	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-103	109' - 110.5'				

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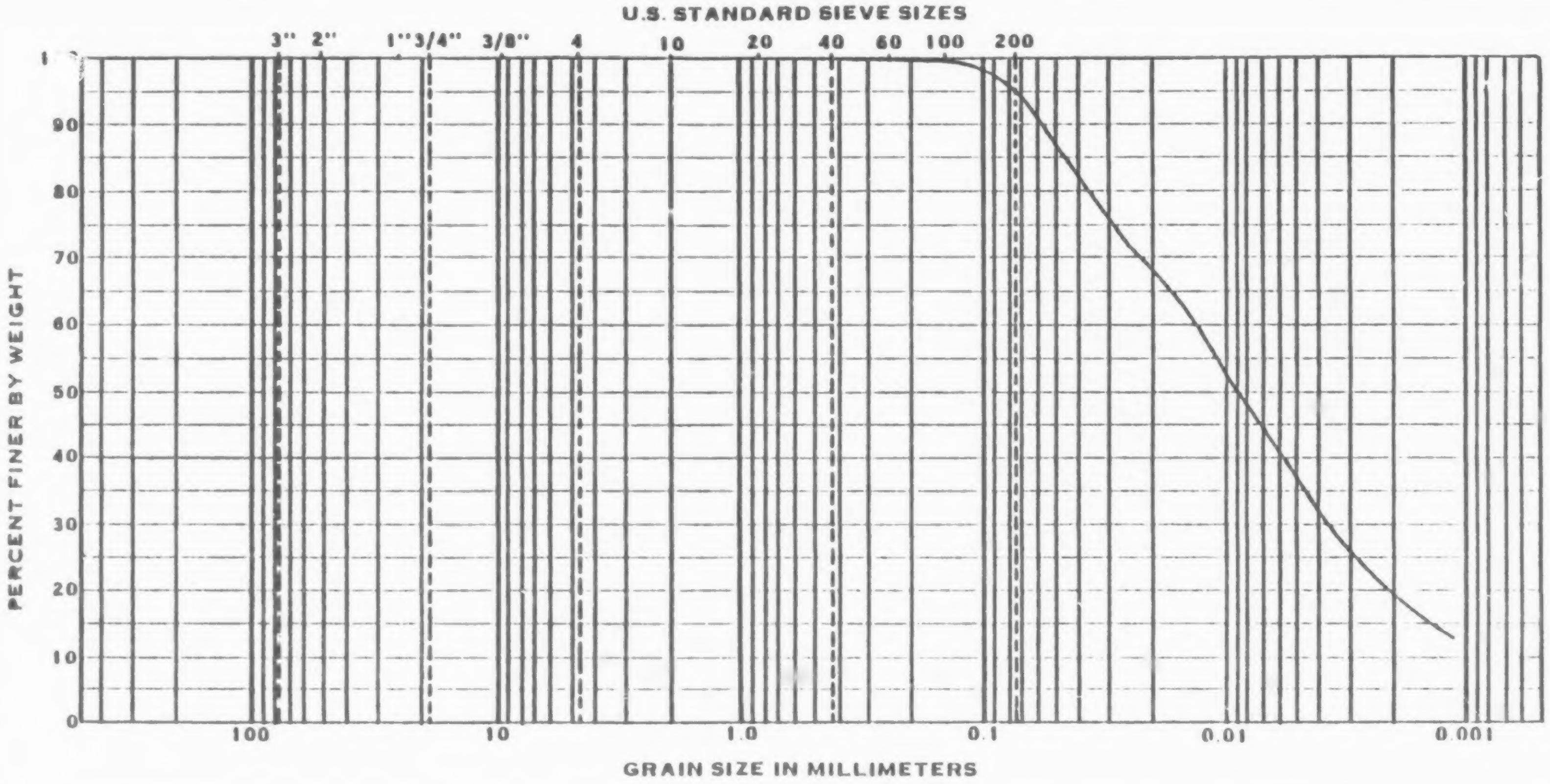
CYPRESS CREEK DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 46



BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-103	219' - 220.5'				

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GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.7

205

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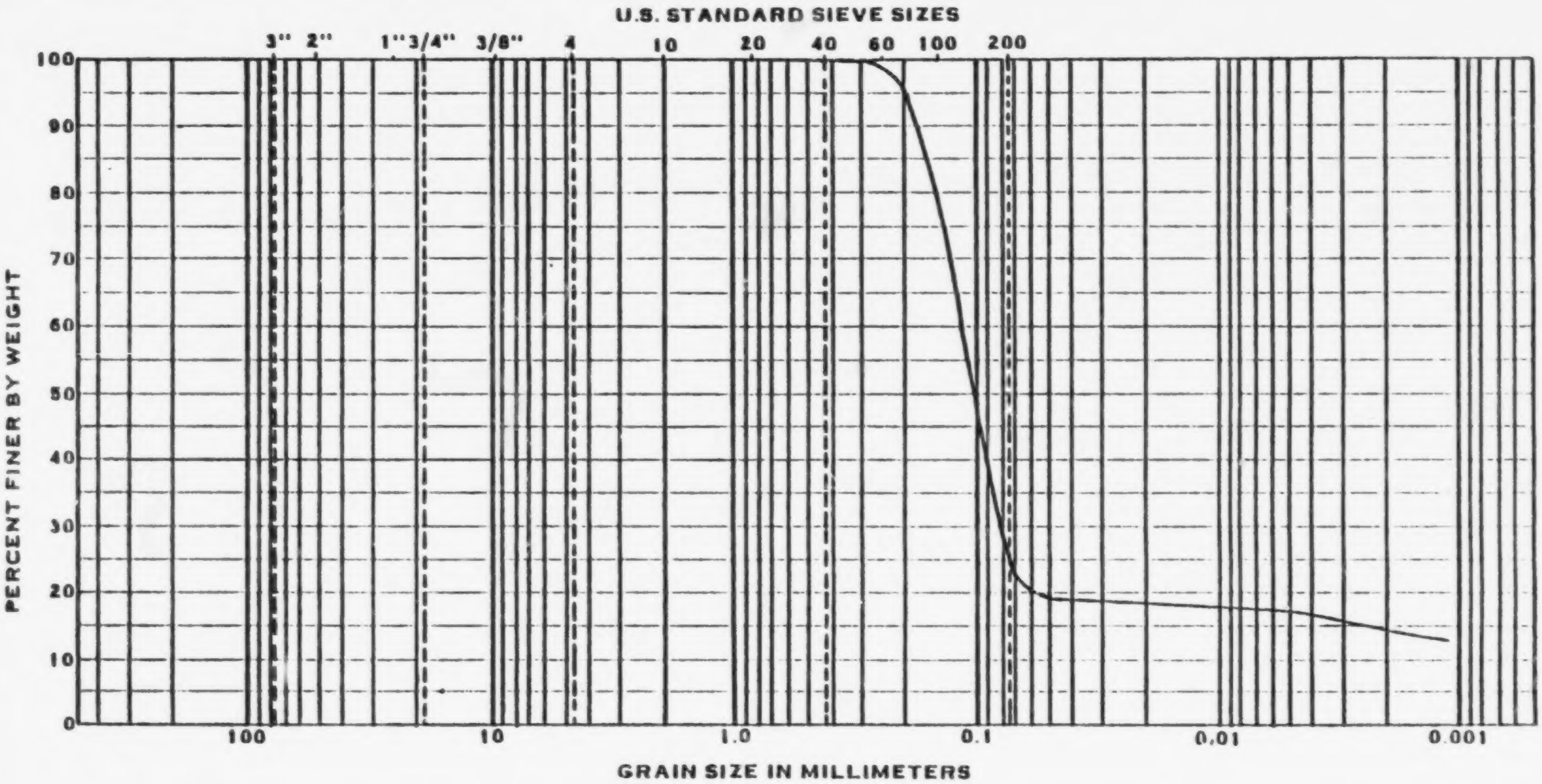

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-104	85'				

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CYPRESS CREEK DOME
GRAIN SIZE DISTRIBUTION

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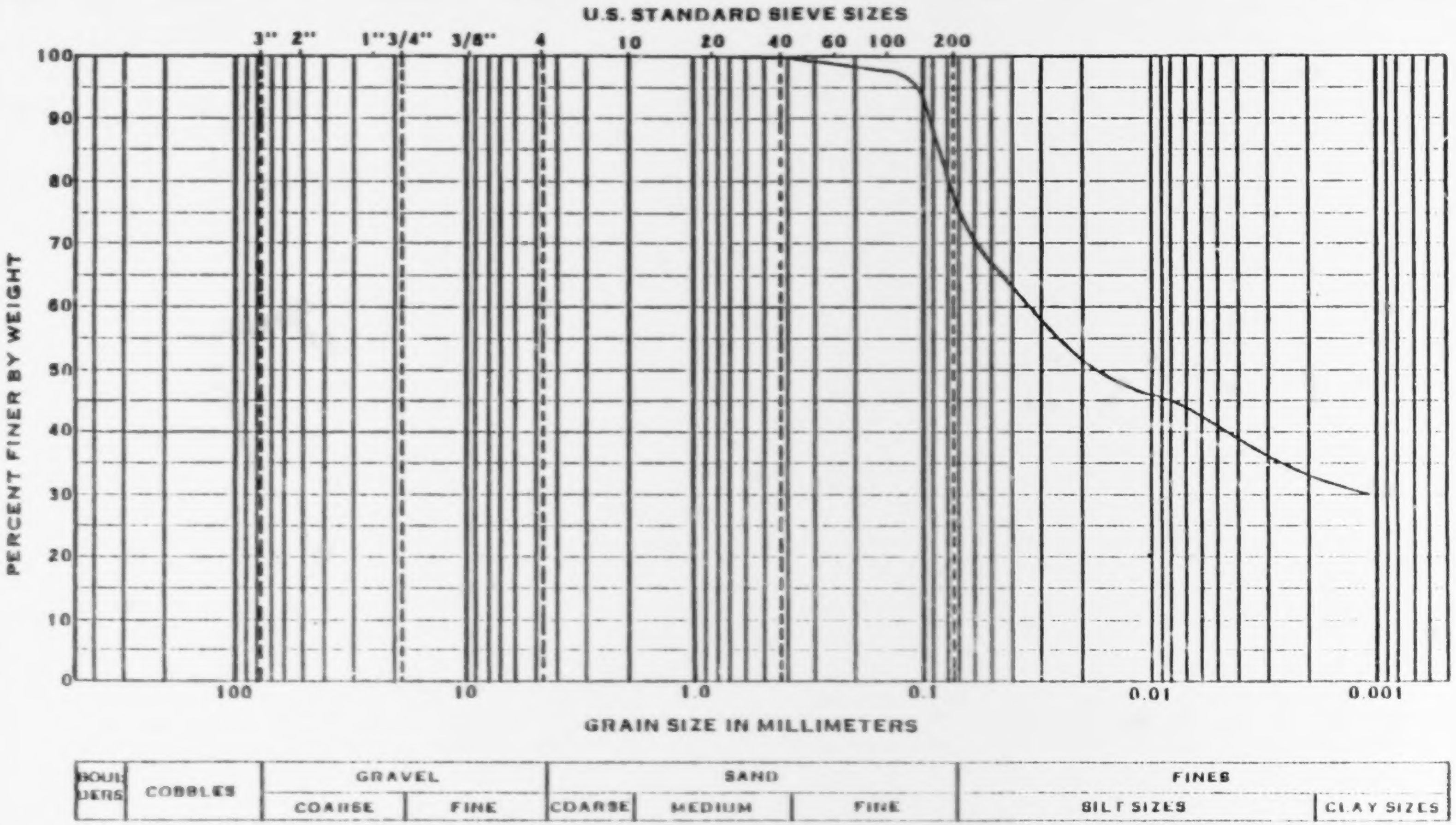

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-107	9'-10.5'				

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GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.9

207

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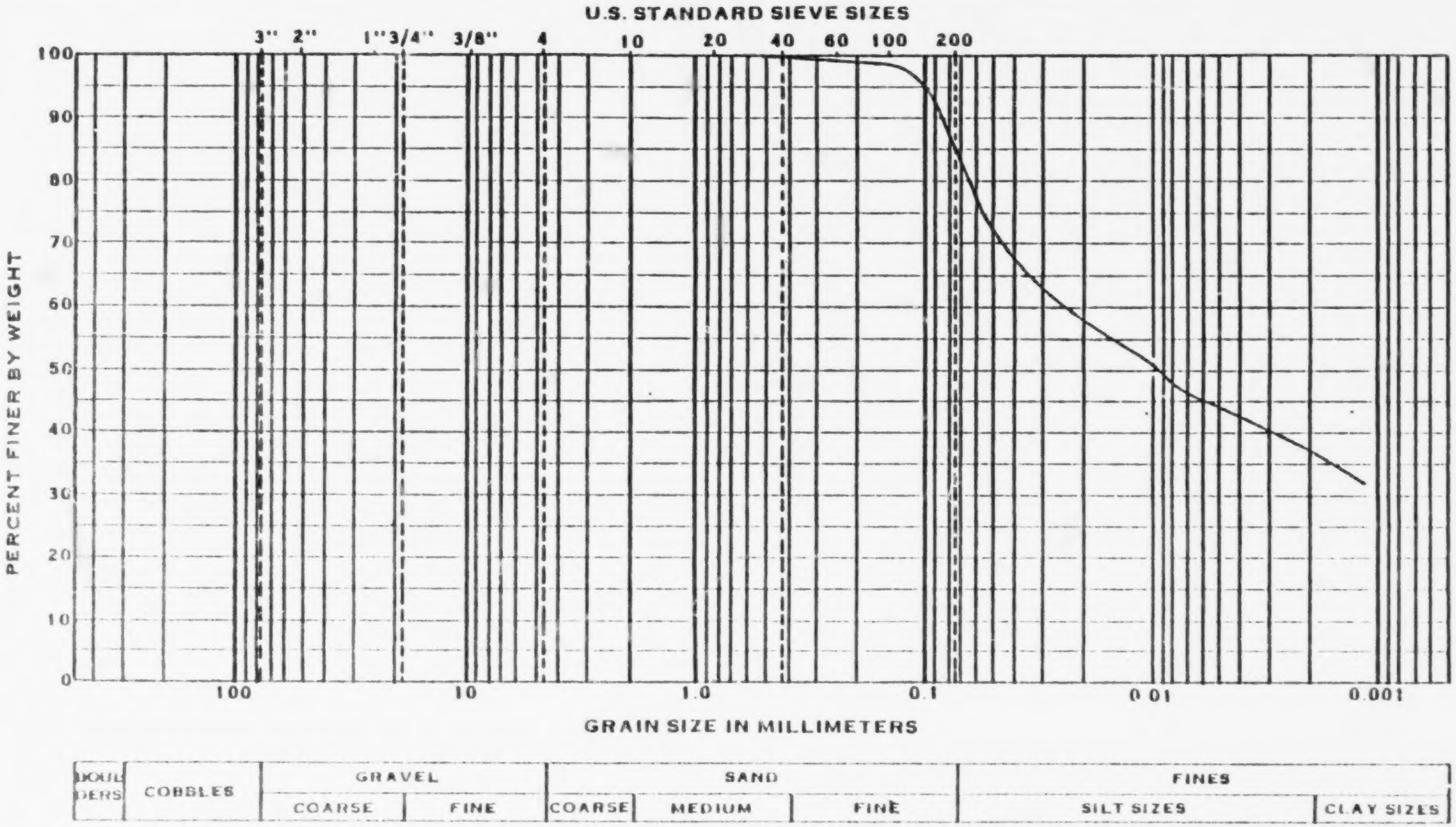

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-107	10'				

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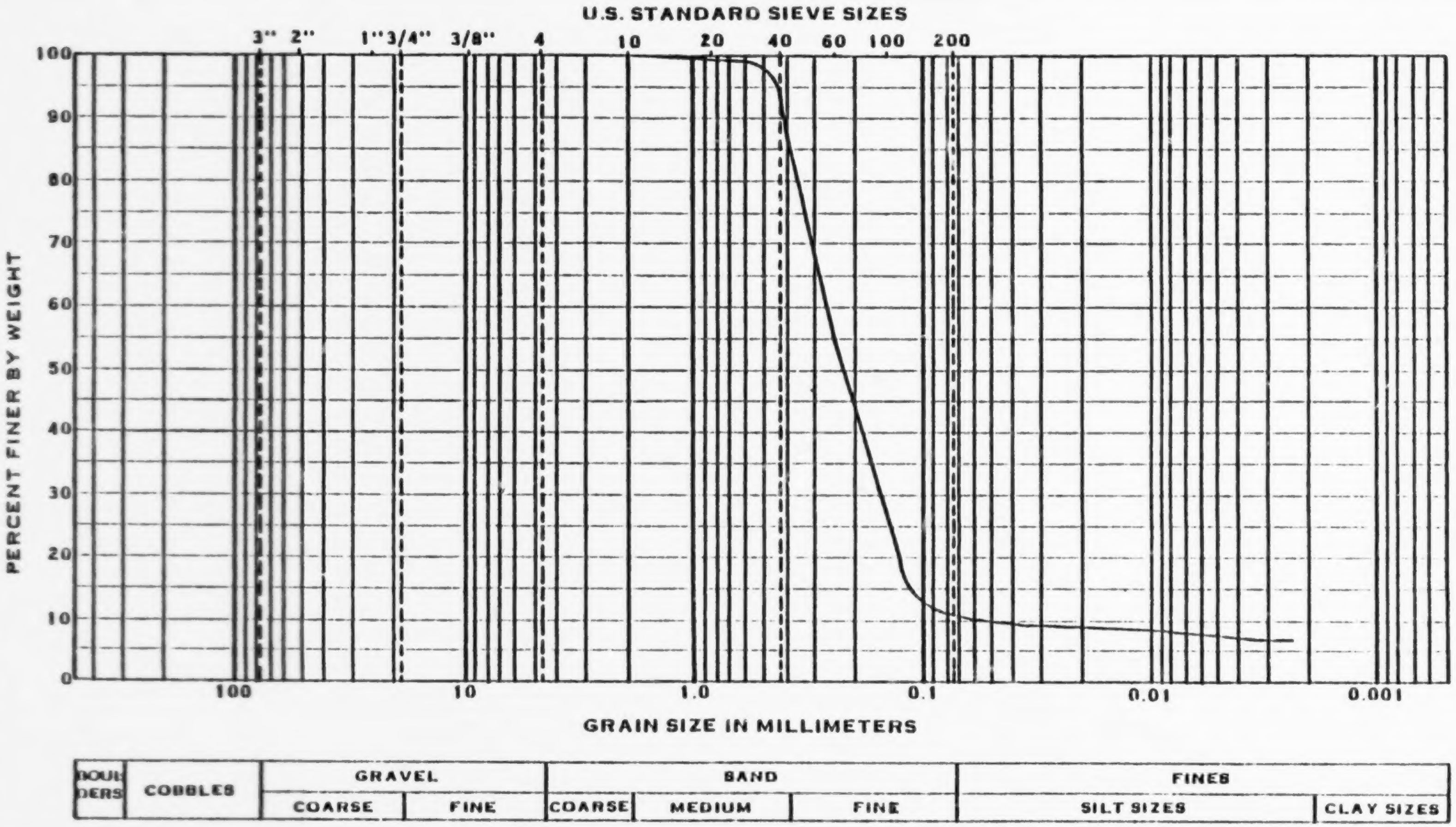

BORING NO.	ELEV. OR DEPTH	NAT WC	L.L.	PL.	PI
MCCG-107	40'				

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GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.11

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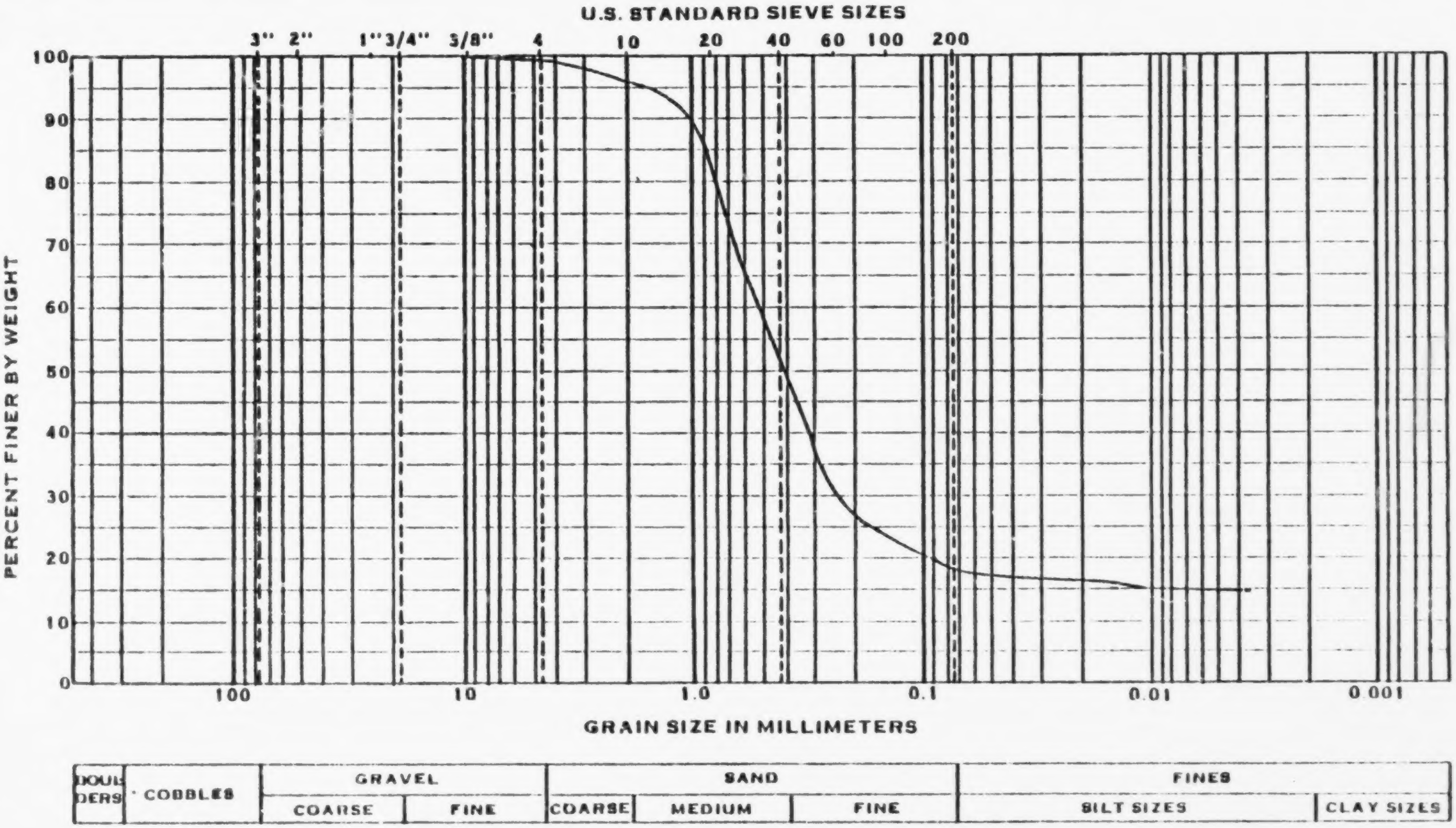

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-110	9' - 10.5'				

PREPARED ________ DATE ______
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GRAIN SIZE DISTRIBUTION

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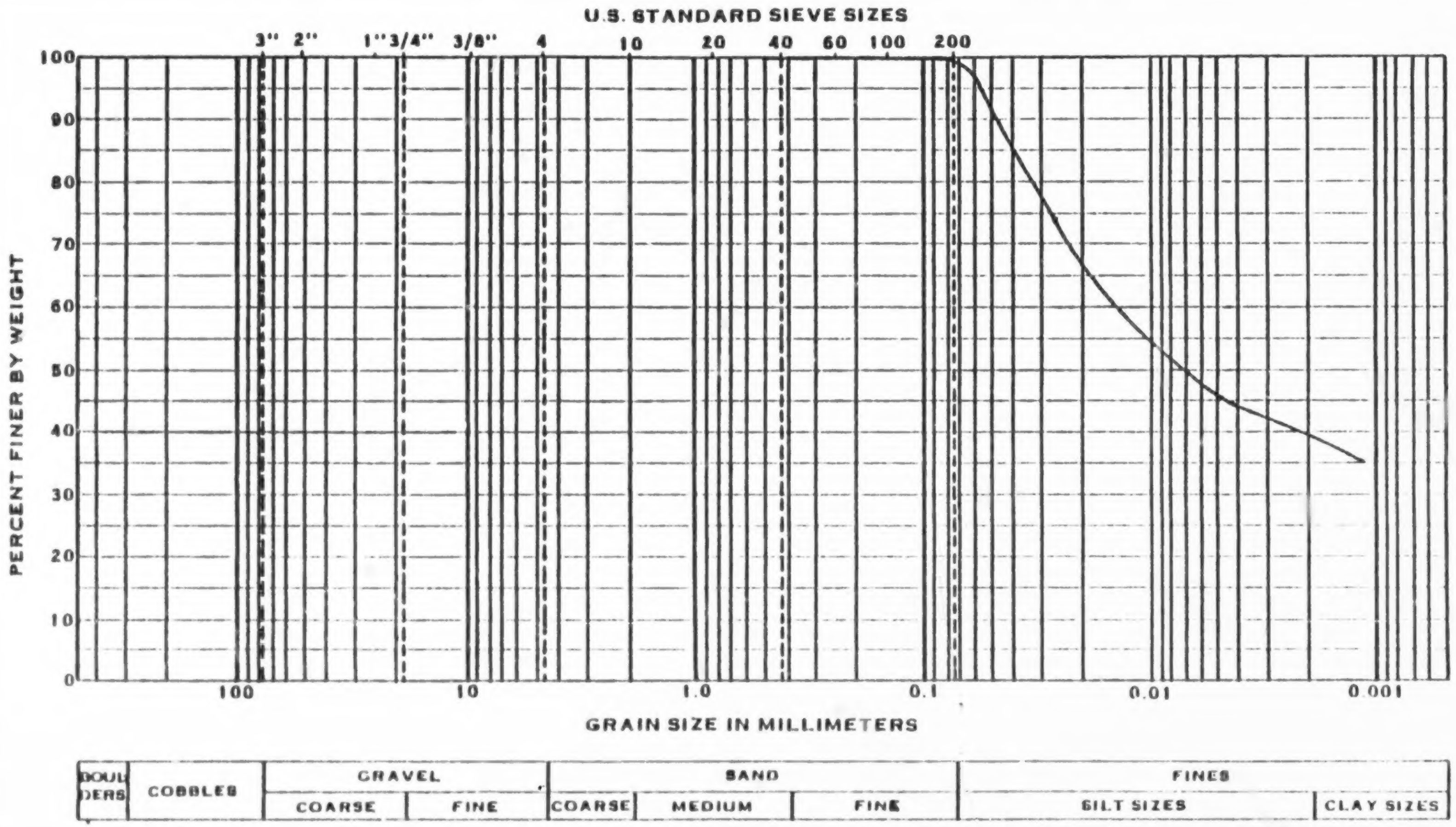

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-111	19'-20.5'				

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GRAIN SIZE DISTRIBUTION

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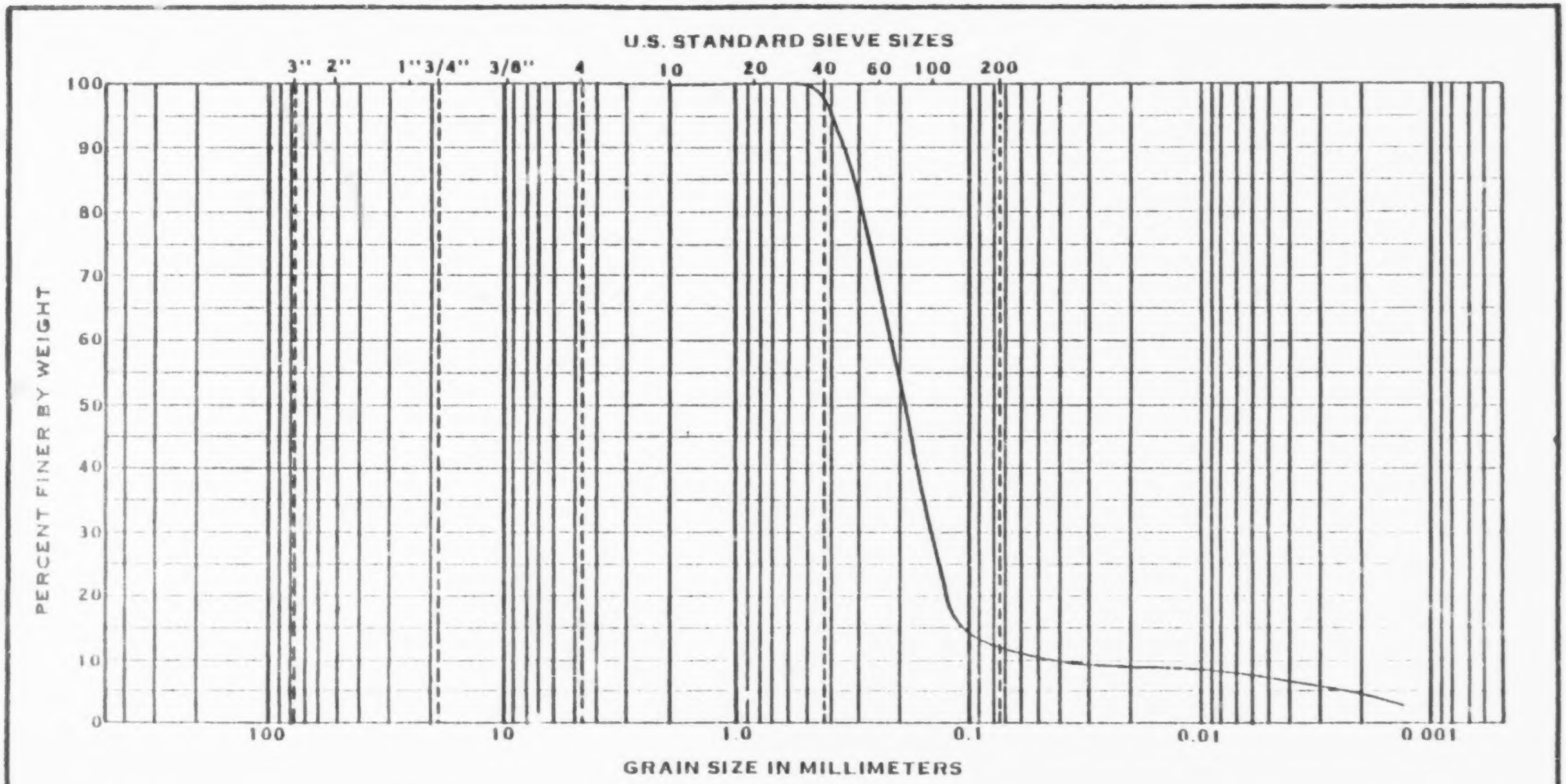

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-111	80'				

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
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CYPRESS CREEK DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B-4.14

212

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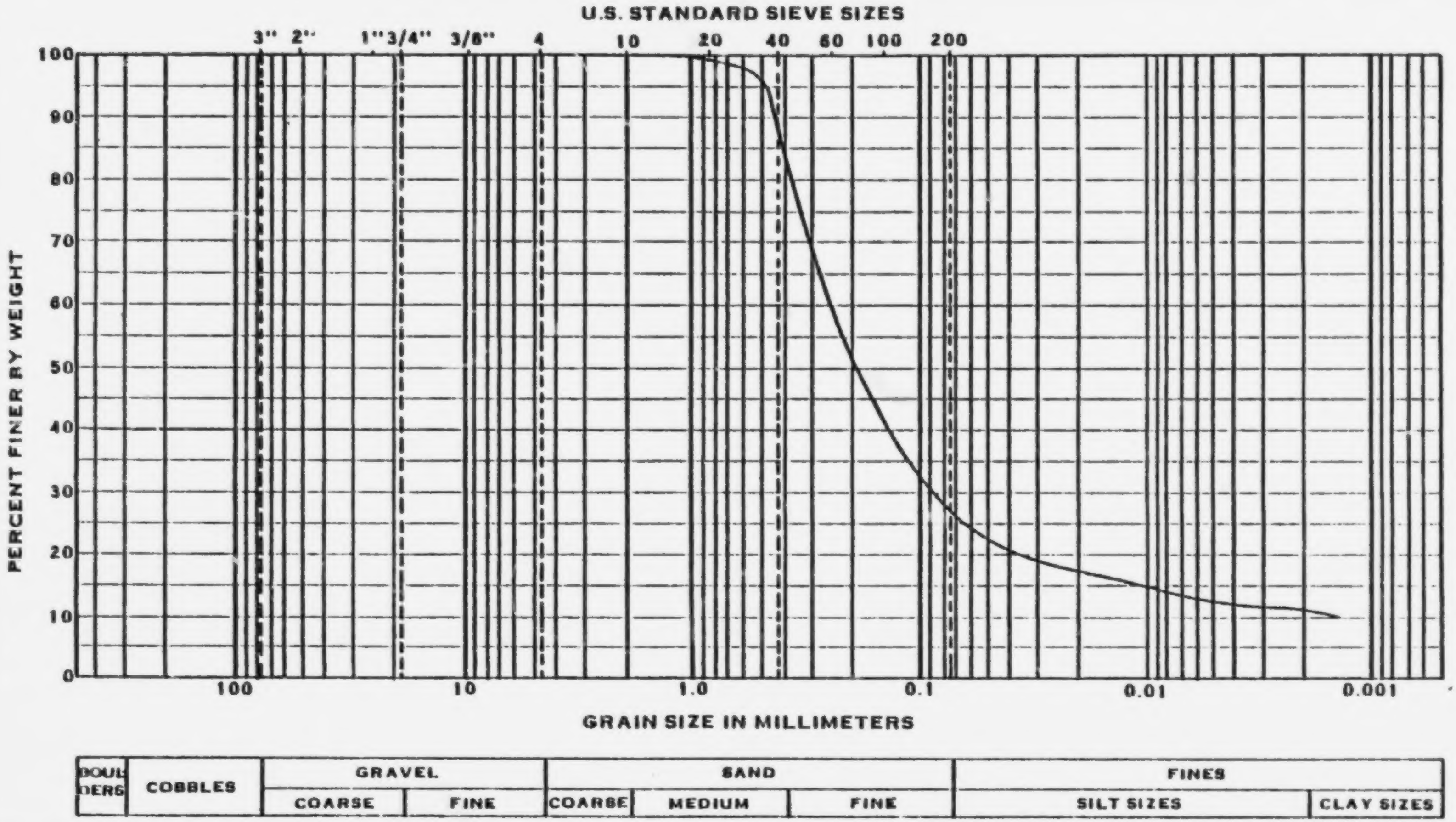

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-112	70'				

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CYPRESS CREEK DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.15

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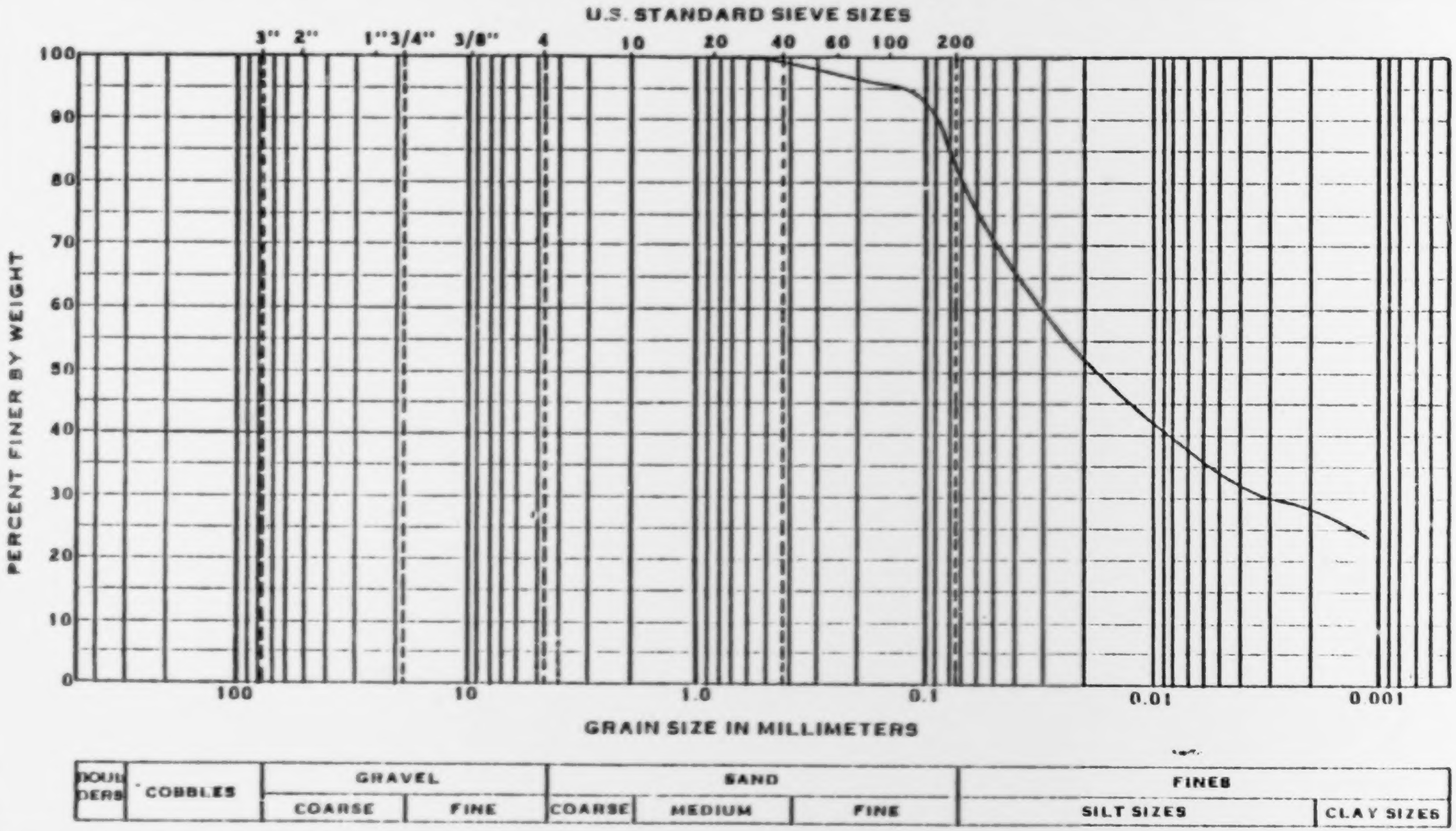

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-112	120'				

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REVISED ______ DATE ____
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APPENDIX B-4
CYPRESS CREEK DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.16

214

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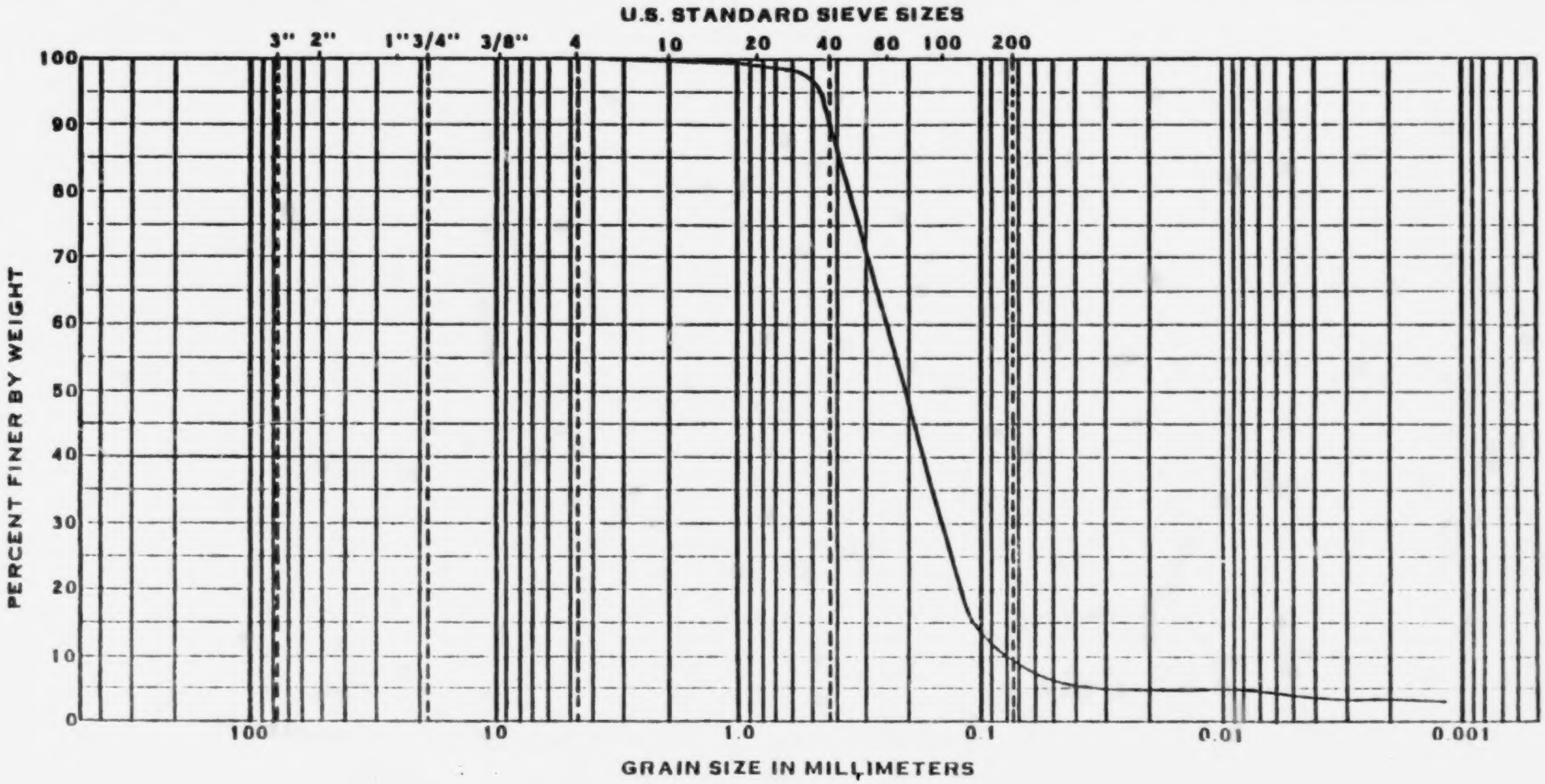

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-112	160'				

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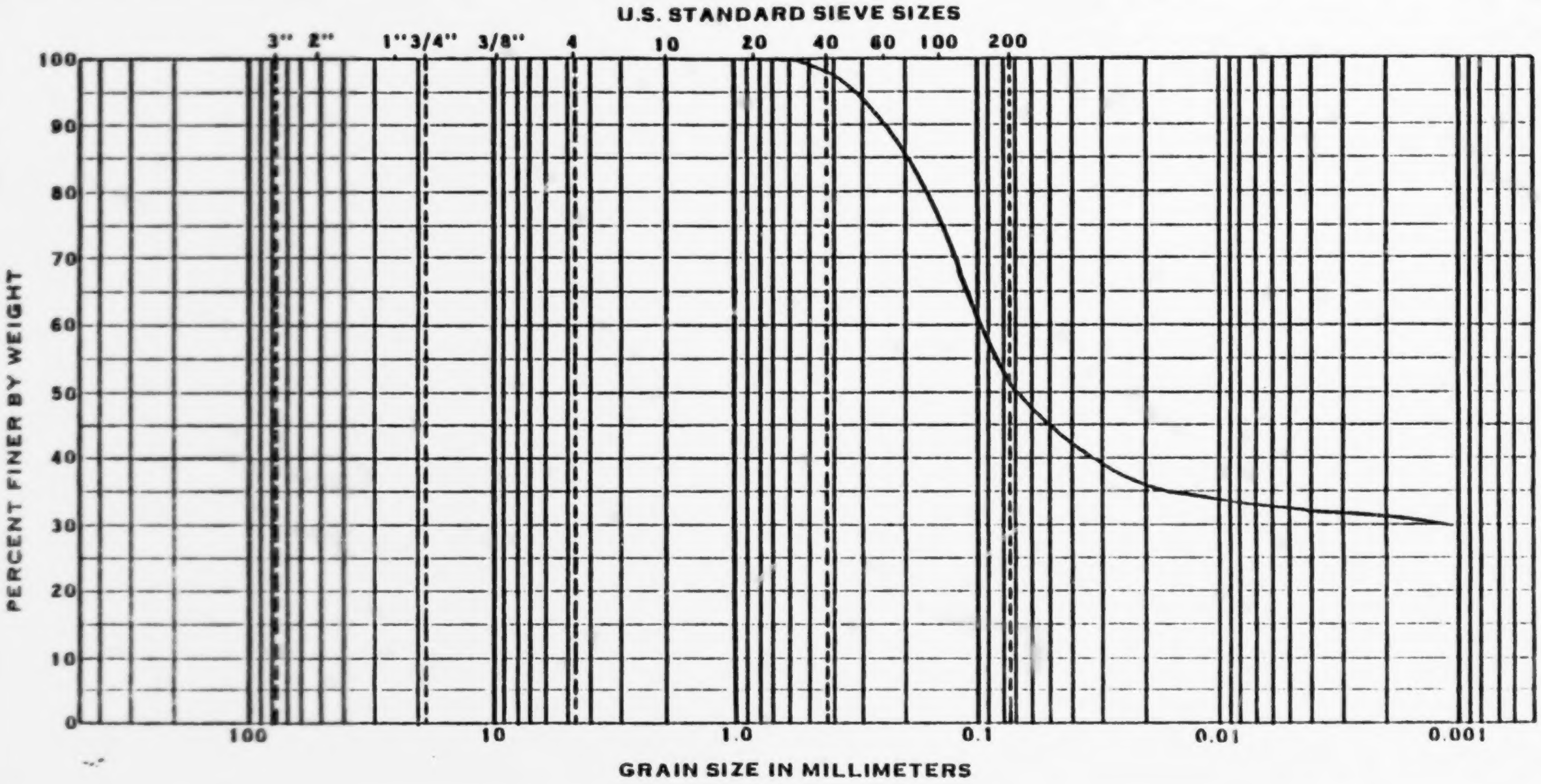
CYPRESS CREEK DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.17



BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-113	9' - 10.5'				

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REVISED ______ DATE ____
REVISED ______ DATE ____
APPROVED ______ DATE ____

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LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX B-4
CYPRESS CREEK DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.18

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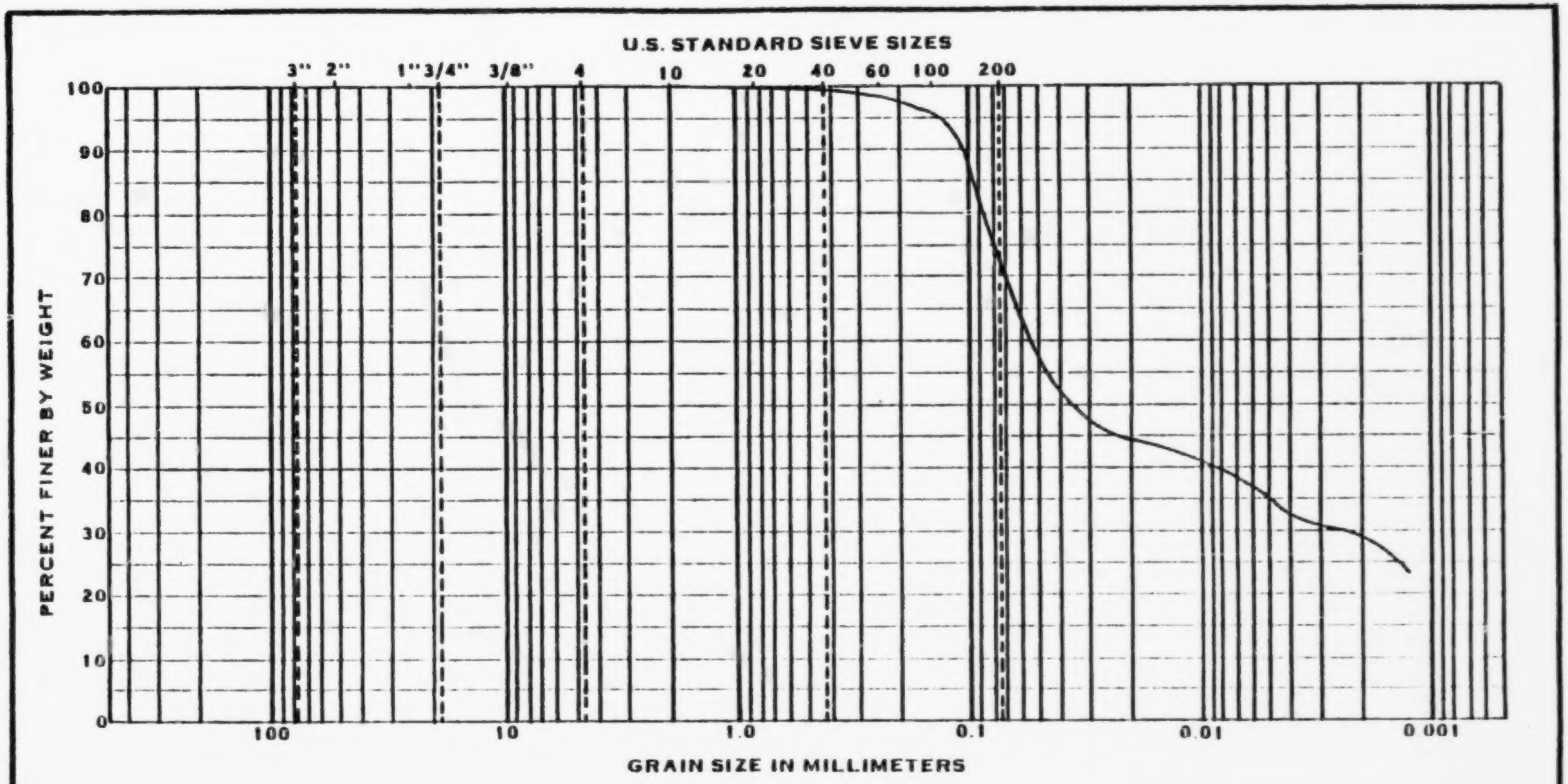

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-115	20'				

PREPARED ________ DATE ____
REVISED ________ DATE ____
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APPROVED ________ DATE ____

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GRAIN SIZE DISTRIBUTION

TABLE NO B - 4.19

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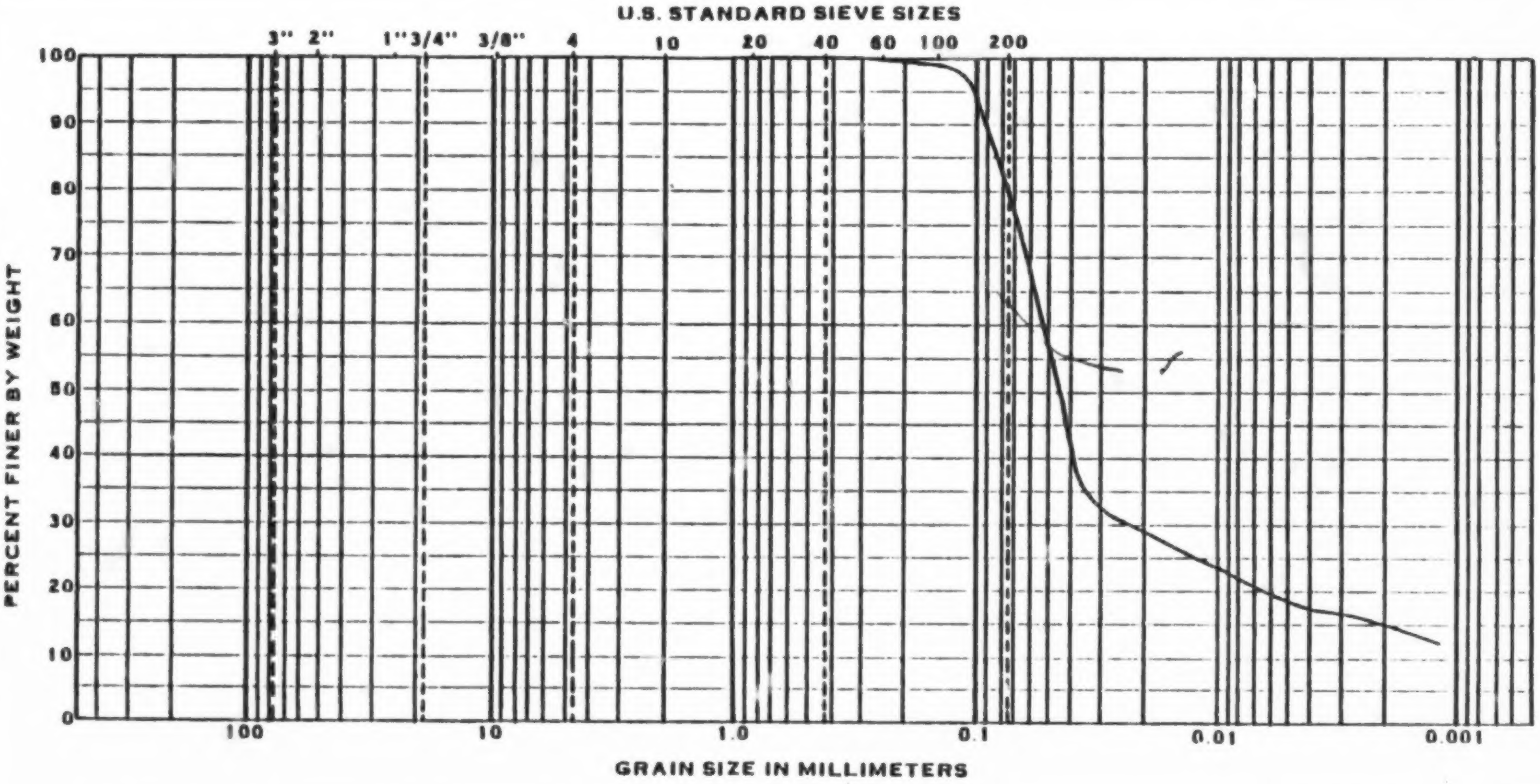

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-115	120'				

PREPARED ______ DATE ____
REVISED ______ DATE ____
REVISED ______ DATE ____
APPROVED ______ DATE ____

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CYPRESS CREEK DOME
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TABLE NO. B - 4.20

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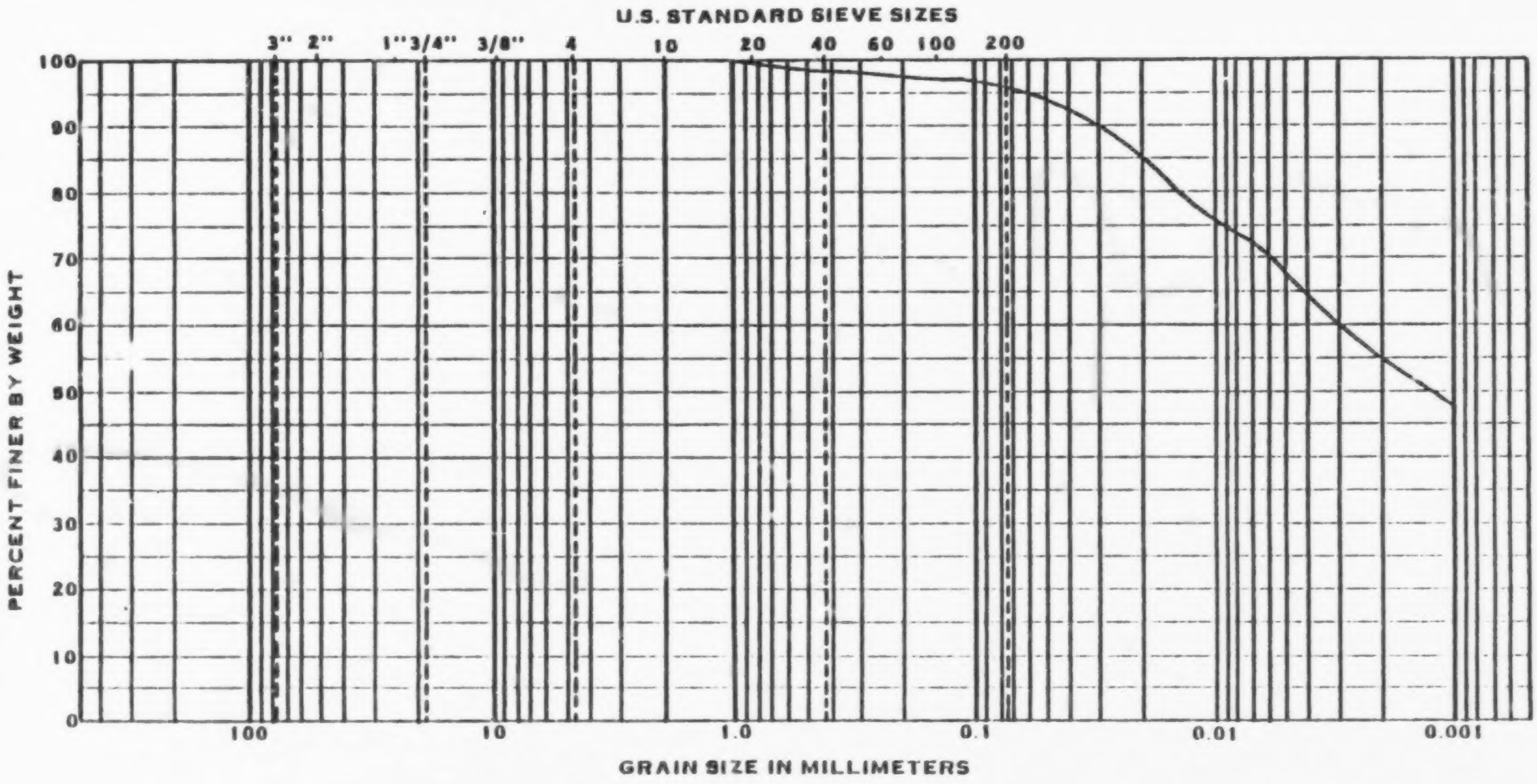

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-116	19' - 20.5'				

PREPARED ________ DATE ______
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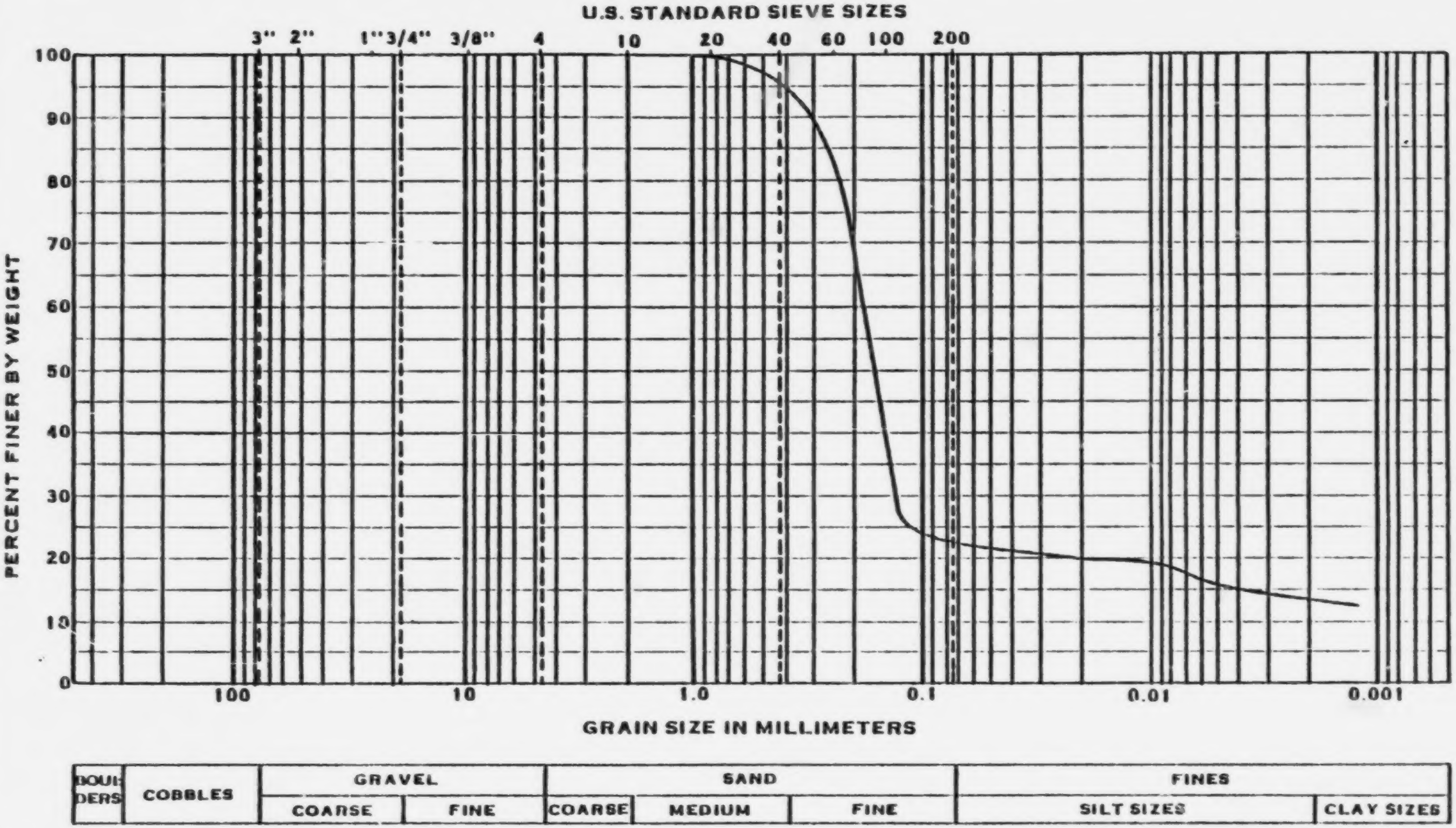
CYPRESS CREEK DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.21



BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-117	9' - 10.5'				

PREPARED ________ DATE ____
REVISED ________ DATE ____
REVISED ________ DATE ____
APPROVED ________ DATE ____

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CYPRESS CREEK DOME
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TABLE NO. B - 4.22

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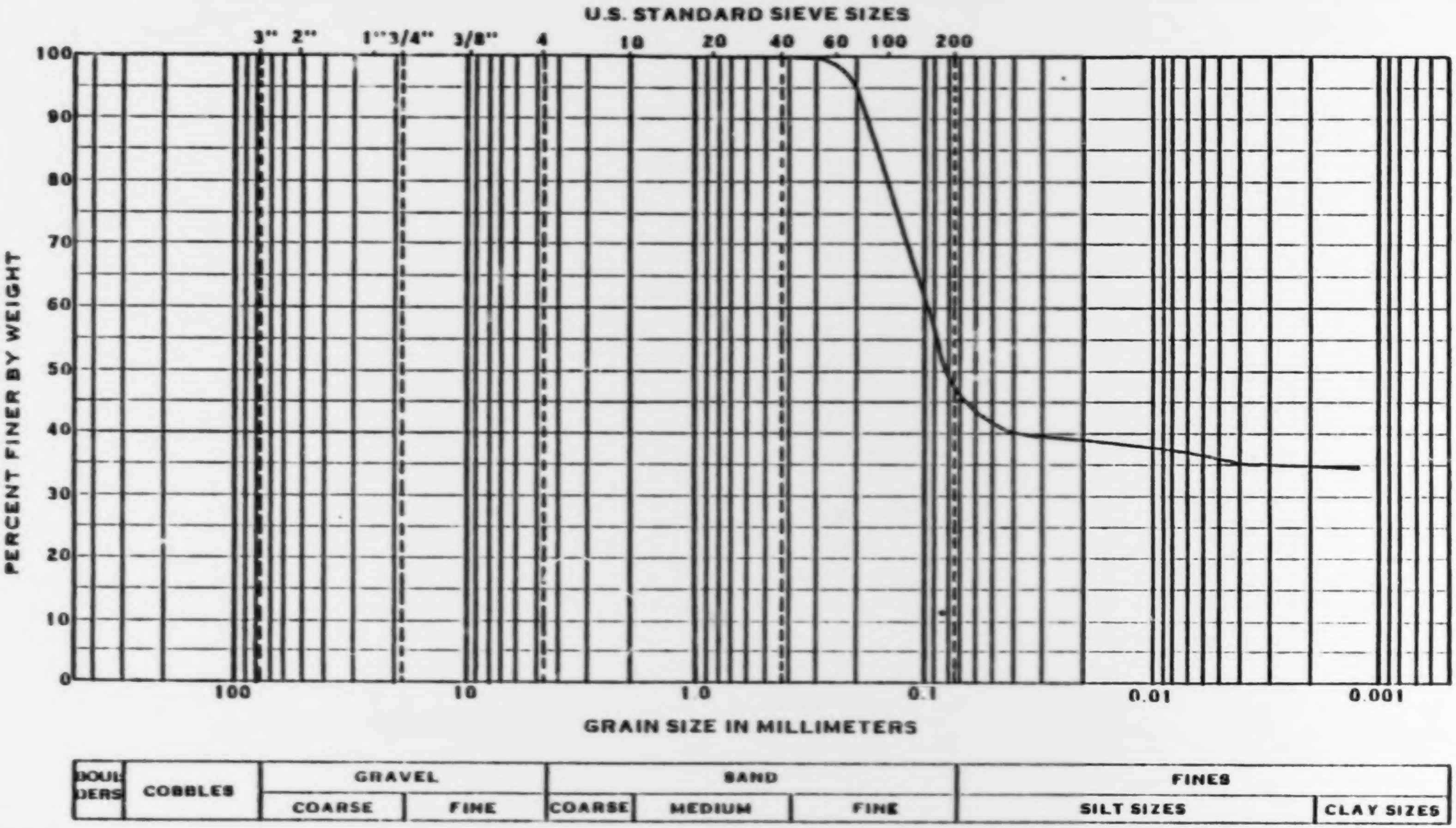

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-118	10'				

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
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TABLE NO. B - 4.23

221

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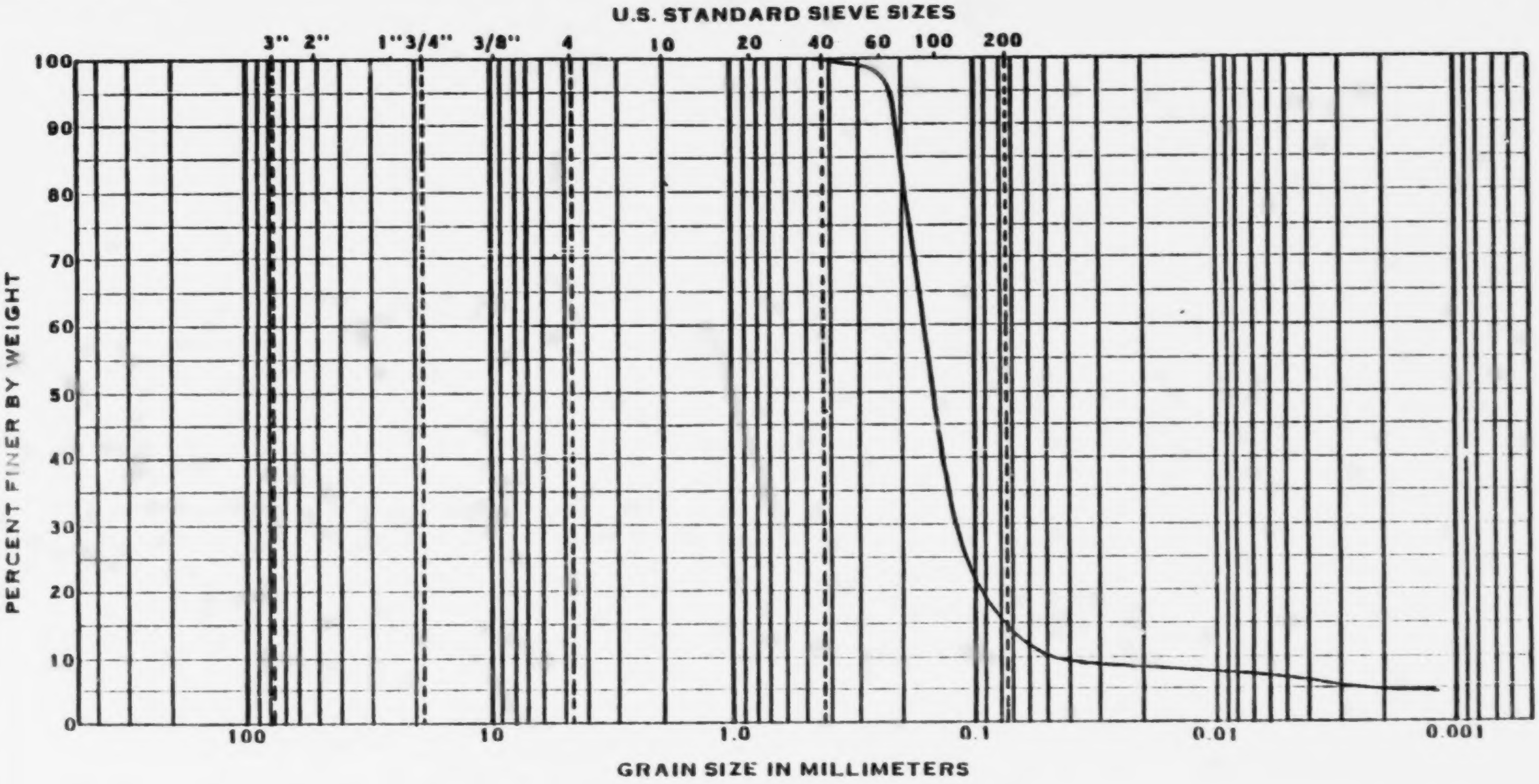

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-118	30'				

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
APPROVED ________ DATE ______

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APPENDIX B-4
CYPRESS CREEK DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.24

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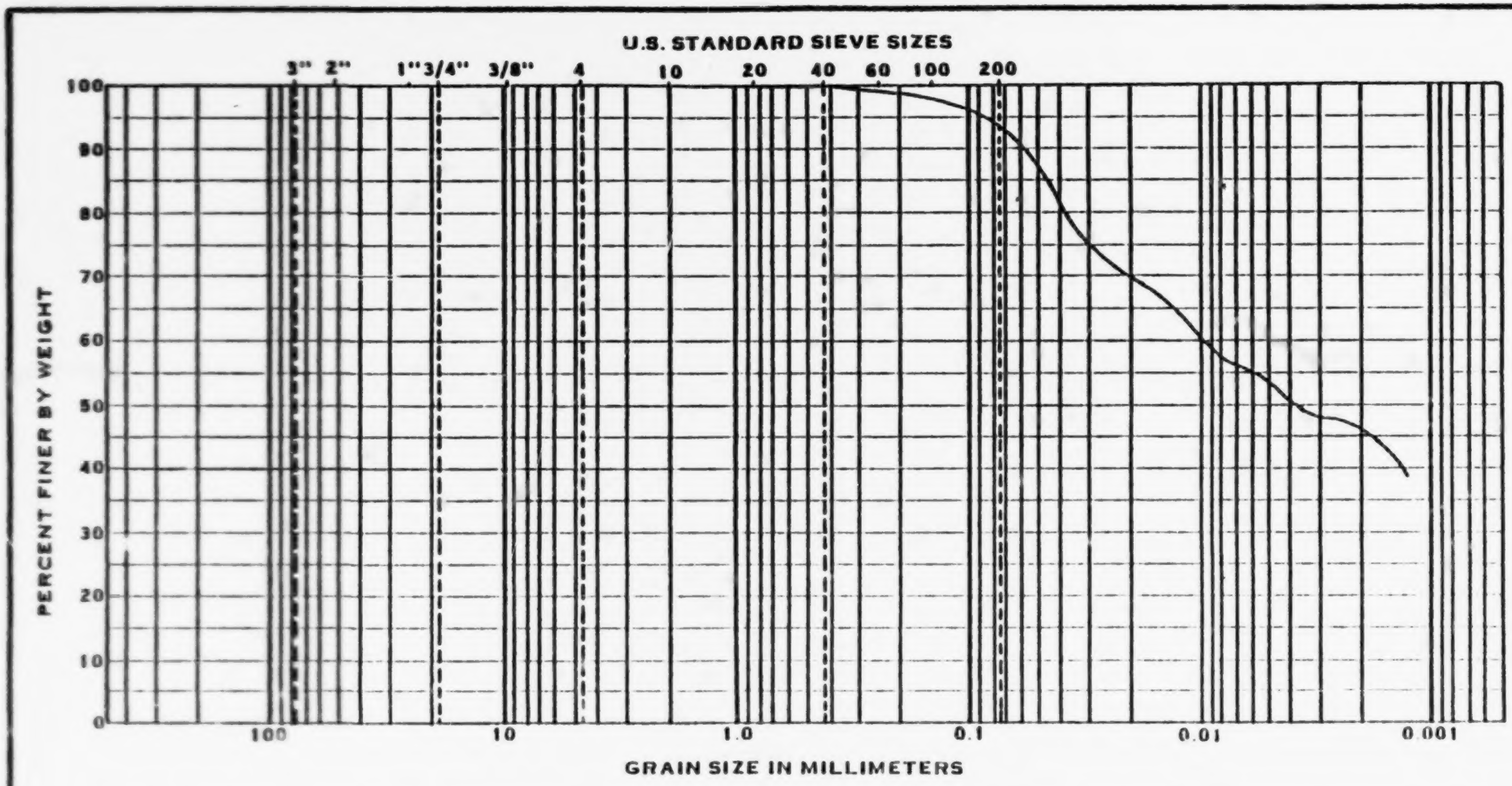

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-118	60'				

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
APPROVED ________ DATE ______

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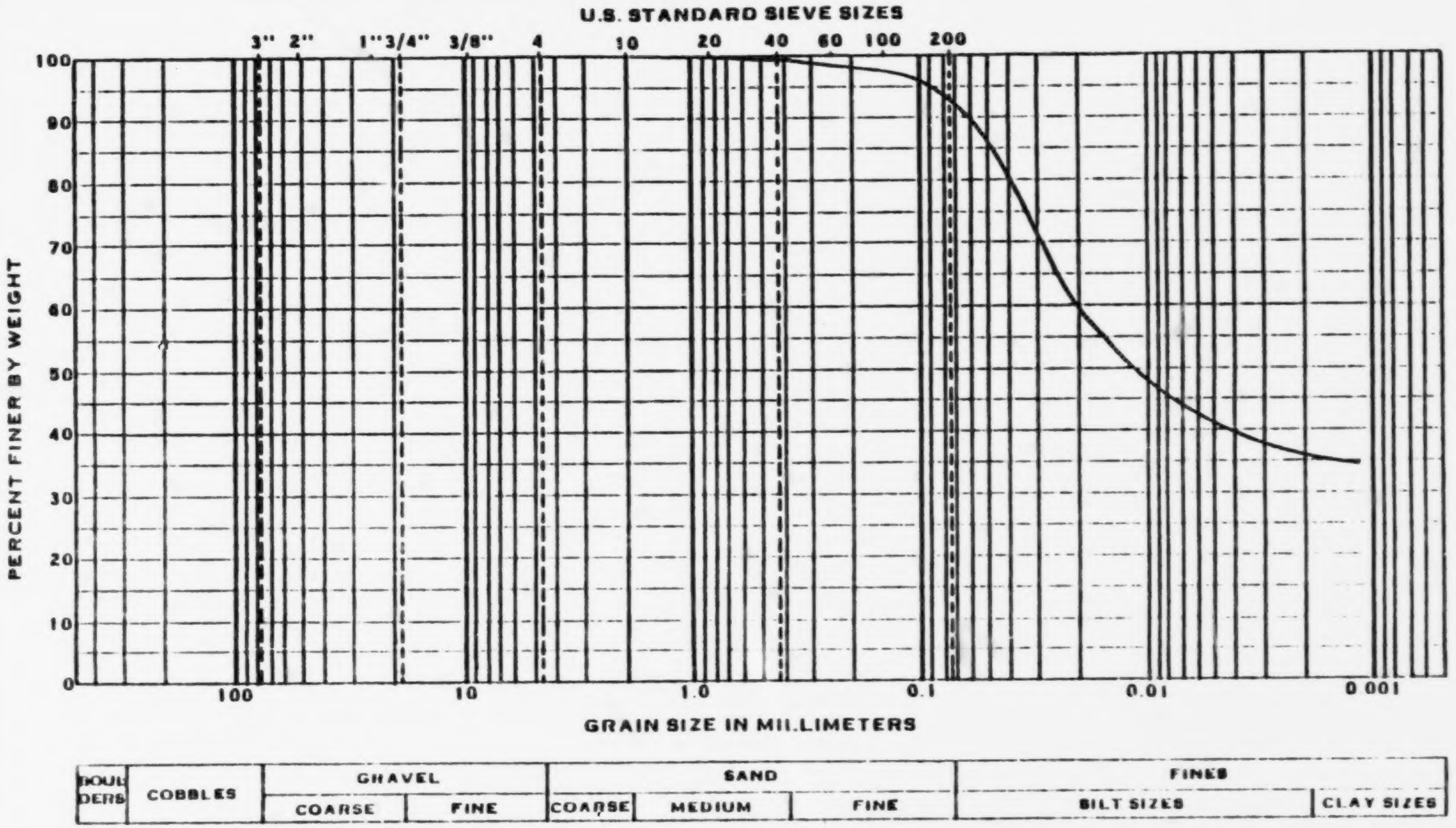
APPENDIX B-4
CYPRESS CREEK DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.25



BORING NO	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-118	89' - 90.5'				

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

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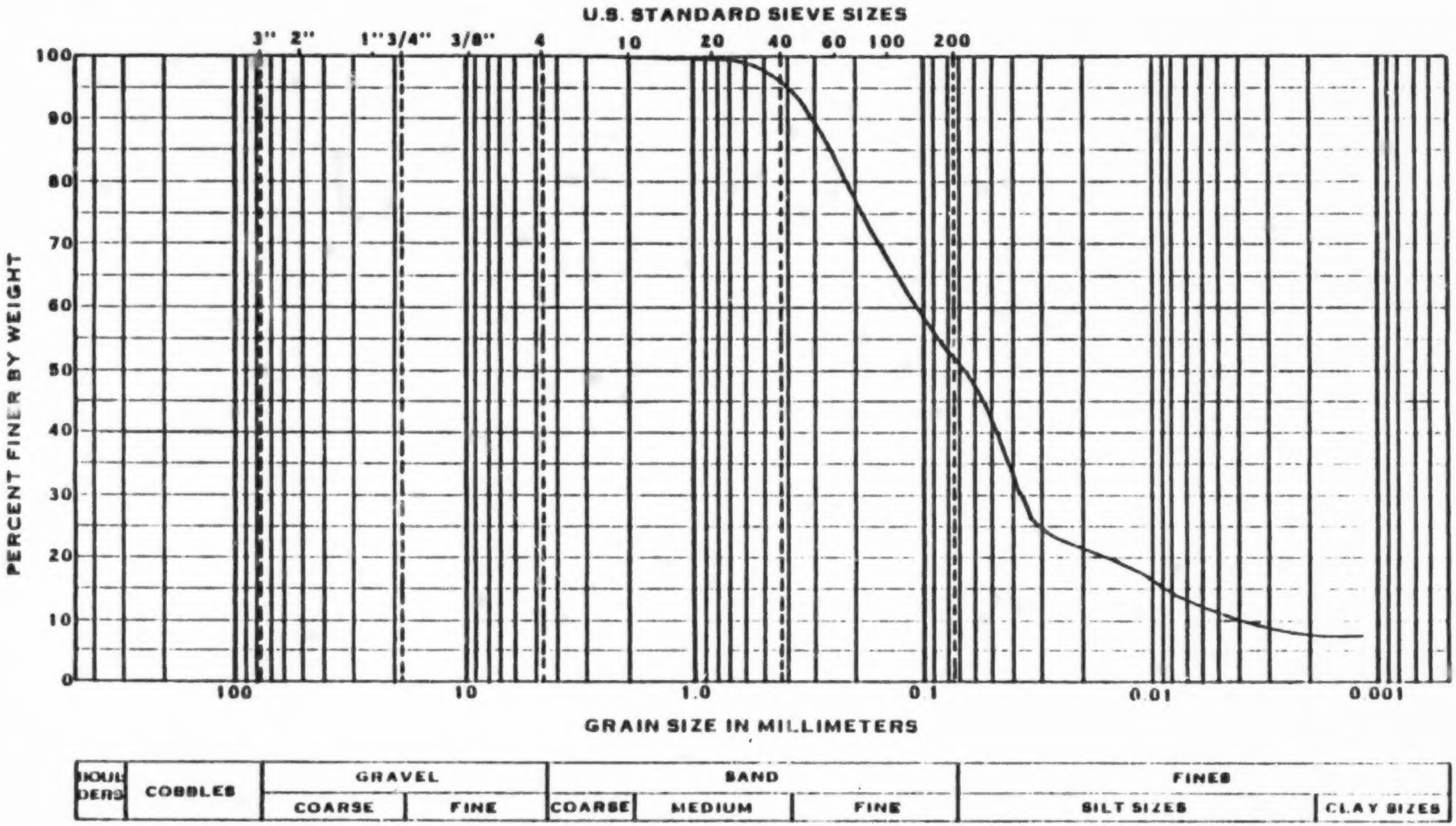
CYPRESS CREEK DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.26



BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG - 119	0' - 1.5'				

PREPARED ________ DATE ____
REVISED ________ DATE ____
REVISED ________ DATE ____
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GRAIN SIZE DISTRIBUTION

TABLE NO. B 4.27

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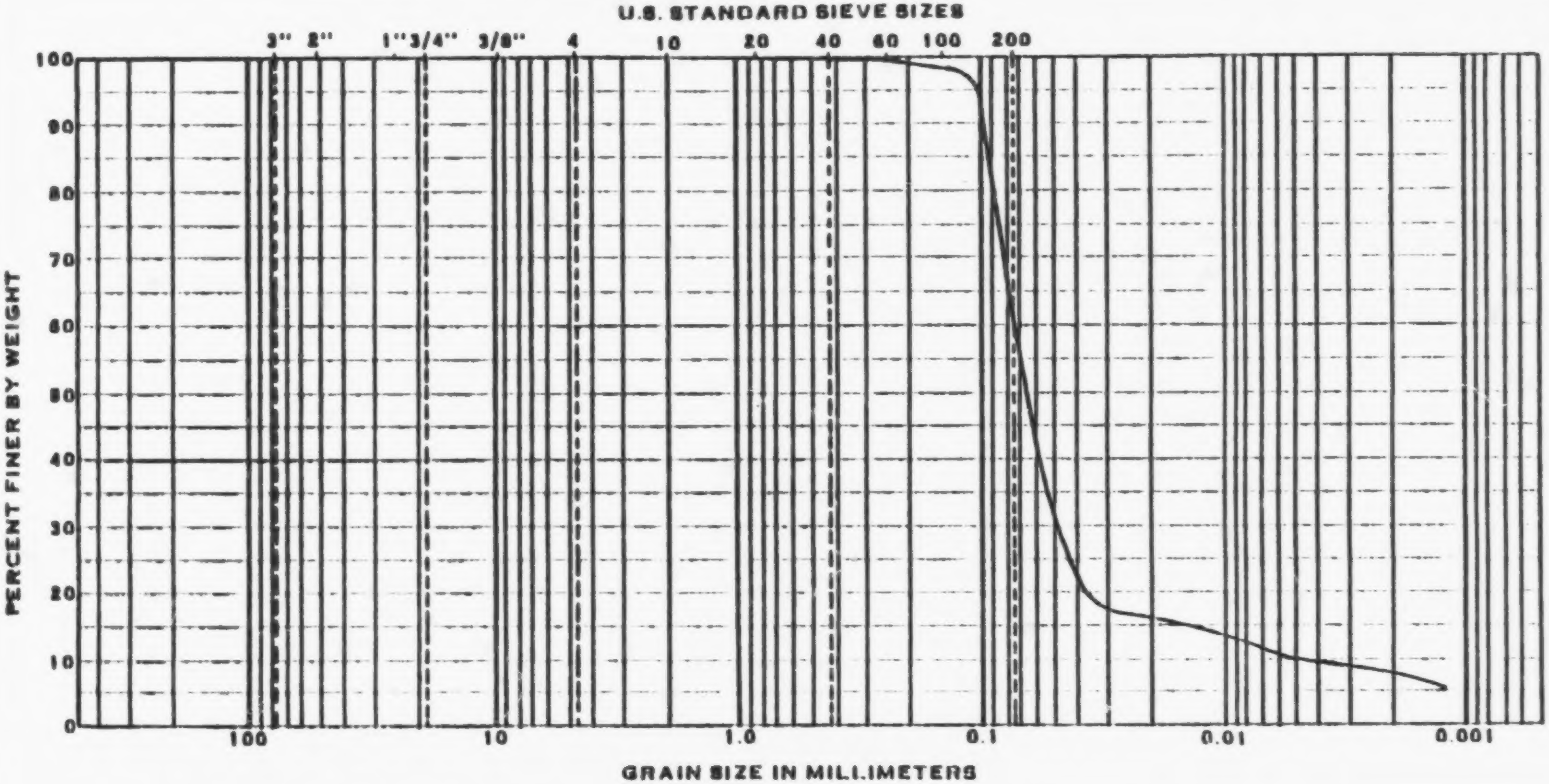

BOUL DERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-119	74' - 75.5'				

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

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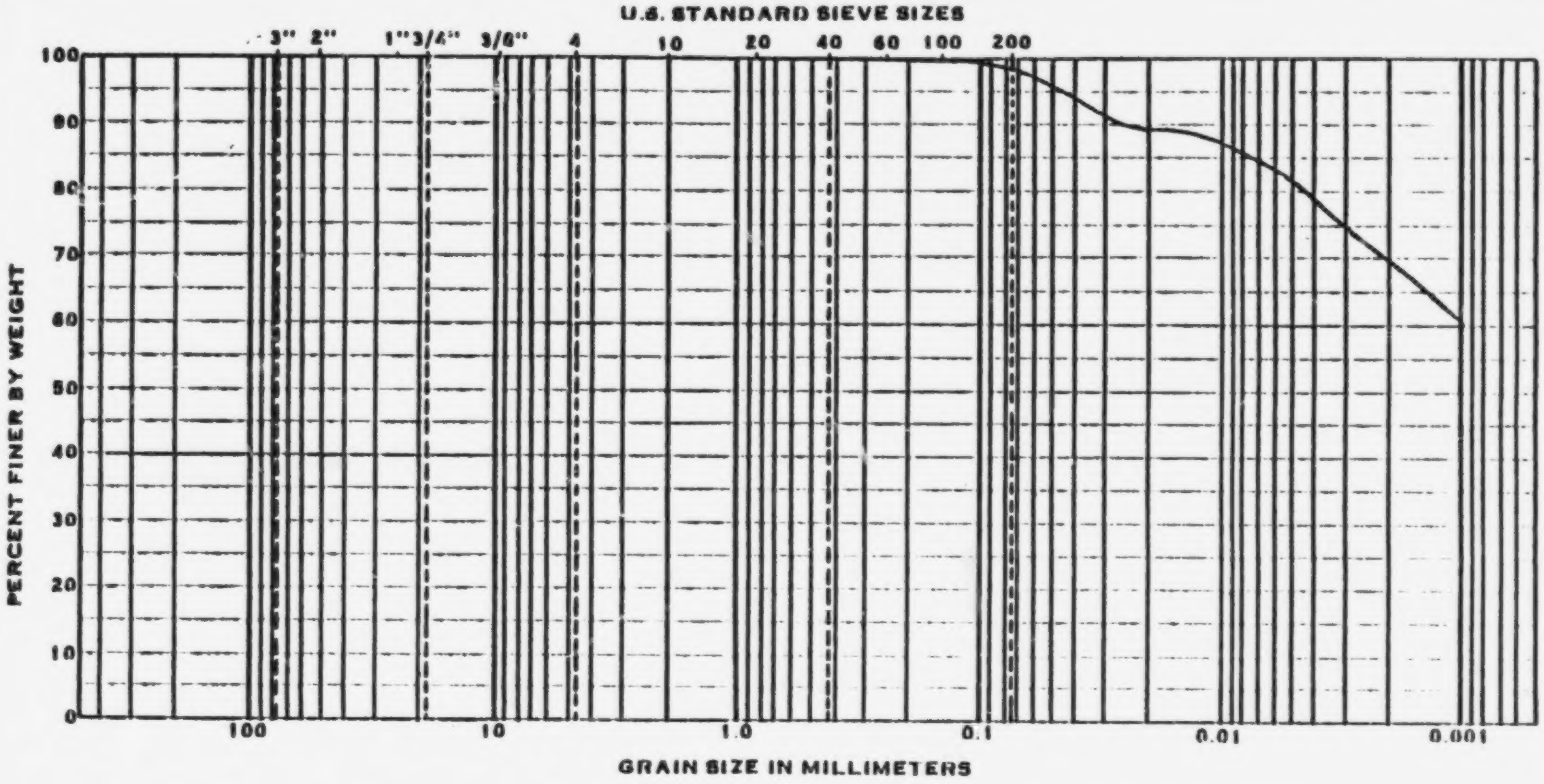
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.28



BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPT	NAT WC	LL	PL	PI
MCCG-201	9' - 10.5'				

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REVISED ______ DATE ______
REVISED ______ DATE ______
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TABLE NO. B - 4.29

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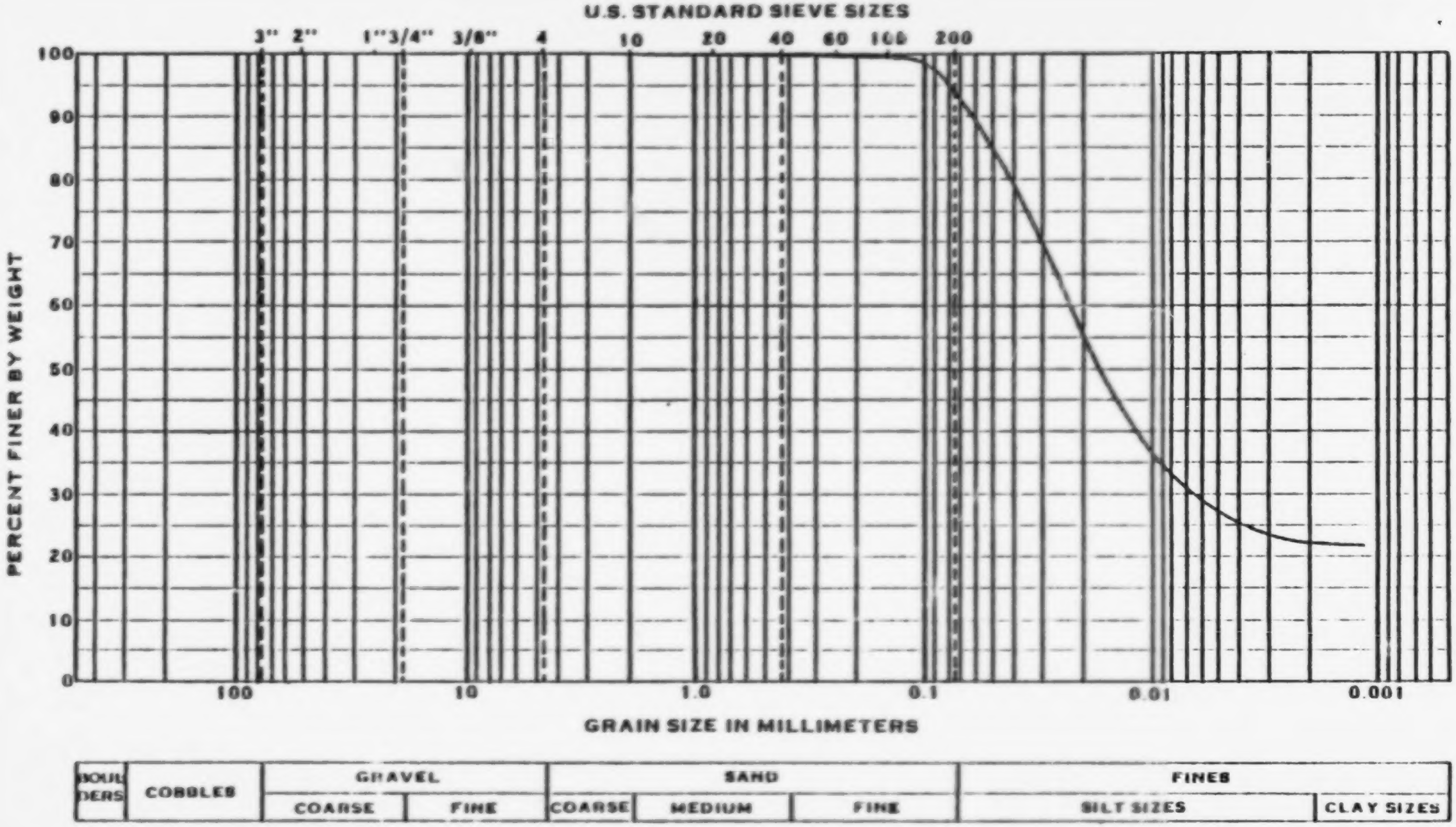

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-201	39' - 40.5'				

PREPARED ________ DATE ____

REVISED ________ DATE ____

REVISED ________ DATE ____

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TABLE NO. B - 4.30

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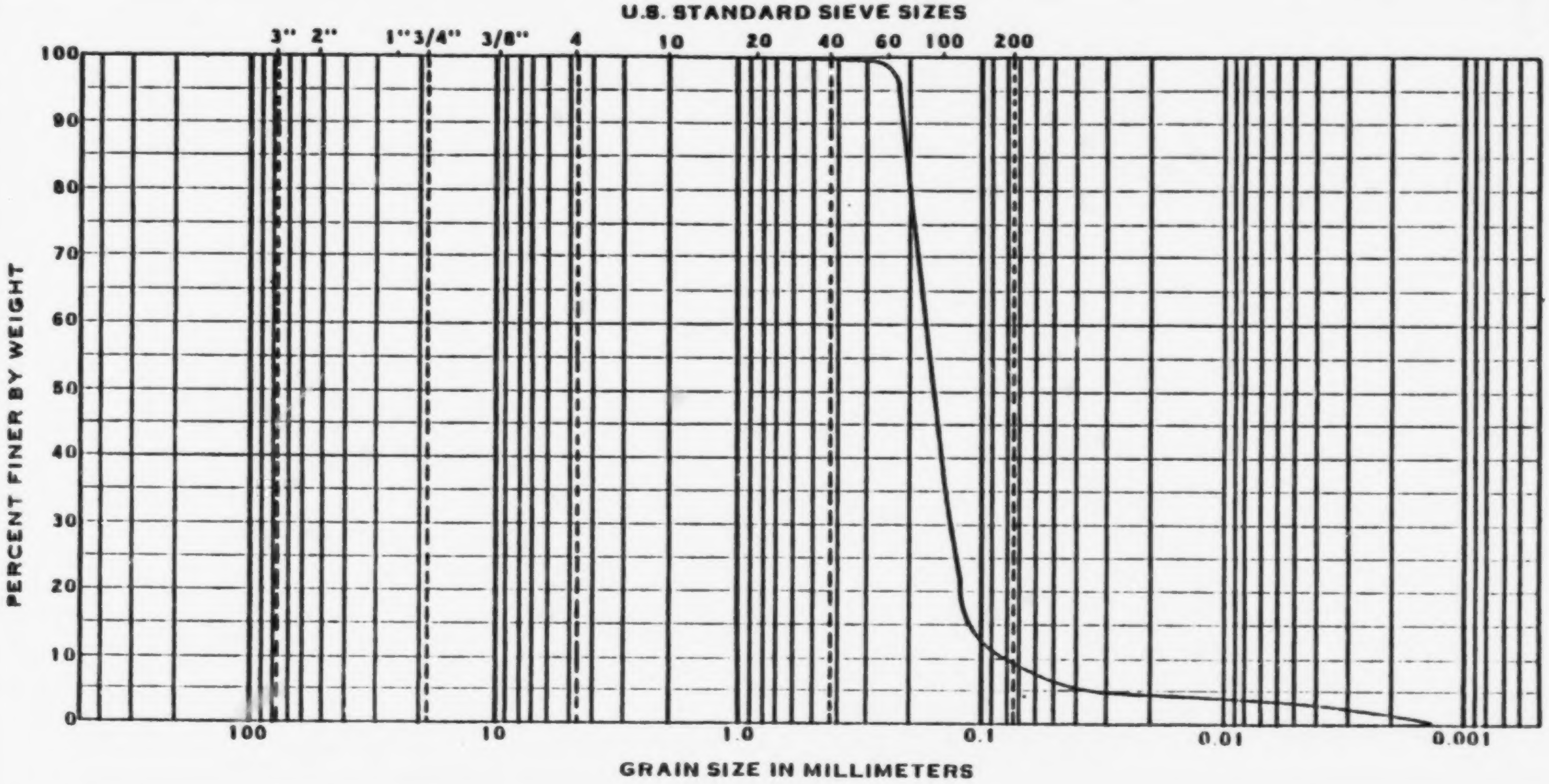

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-201	49' - 50.5'				

PREPARED ________ DATE ____
REVISED ________ DATE ____
REVISED ________ DATE ____
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TABLE NO. B - 4.31

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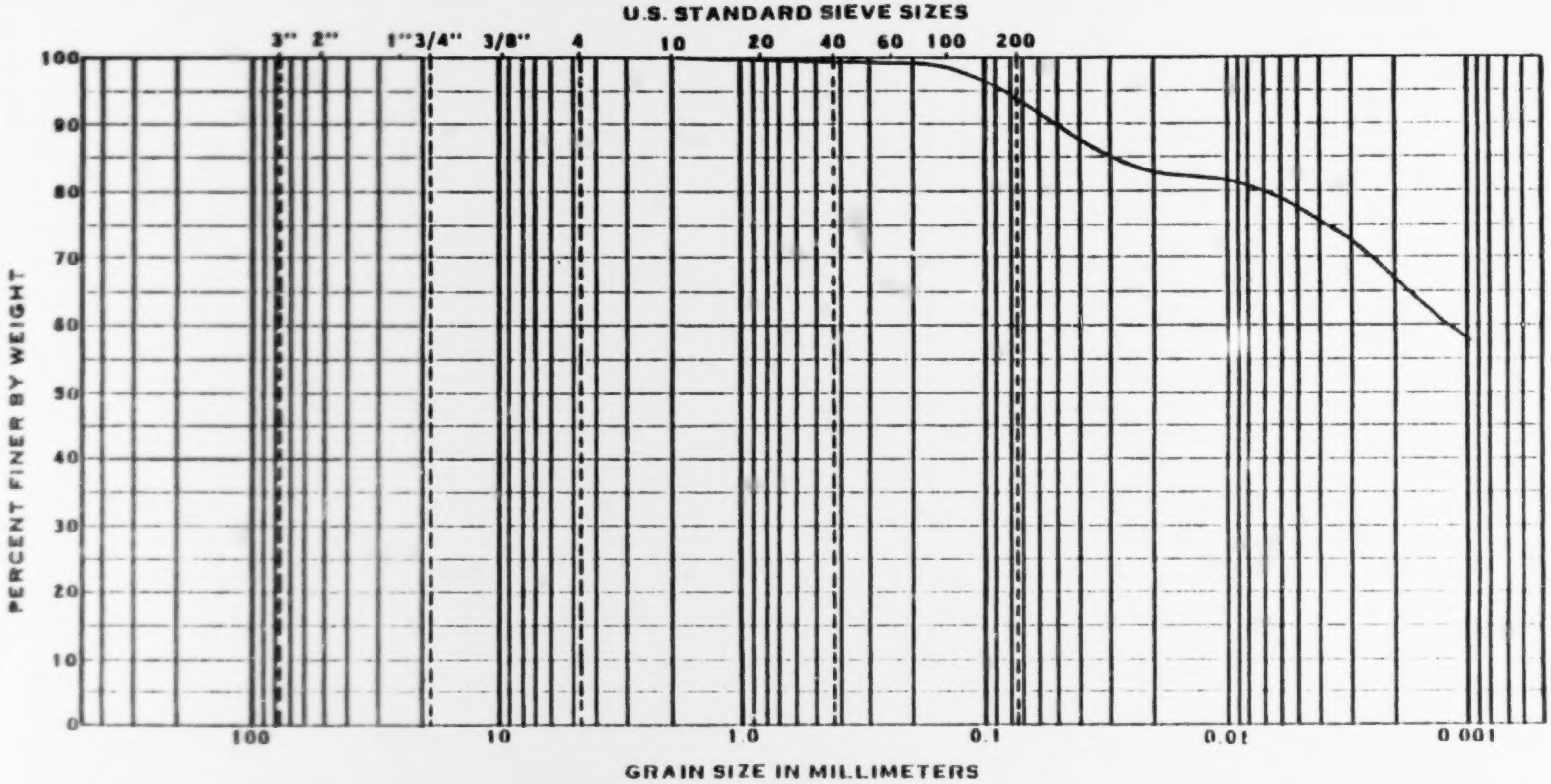

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-201	79' - 80.5'				

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REVISED ______ DATE ______
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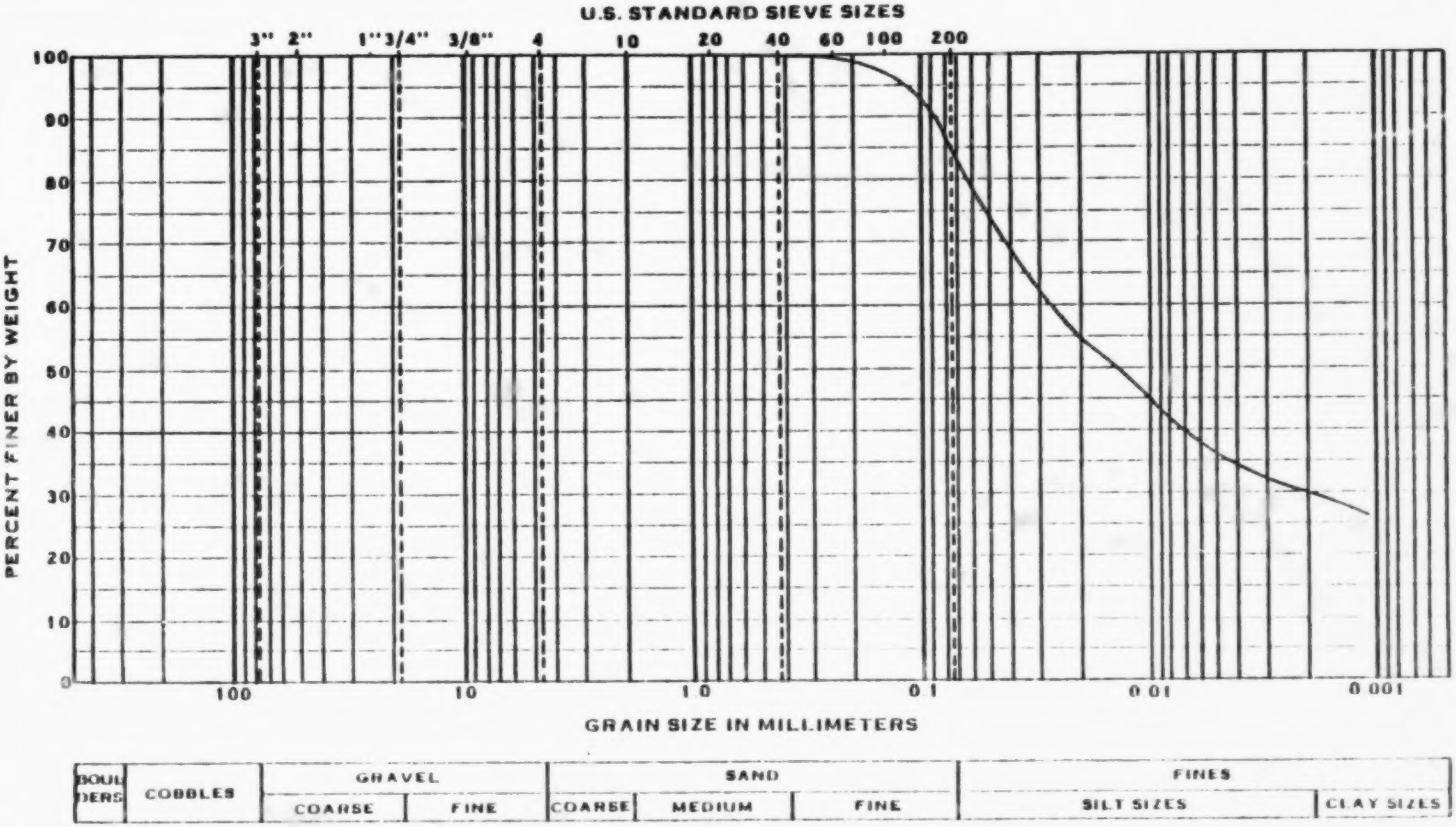
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.32



BORING NO	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-201	149'-150 5'				

PREPARED ________ DATE ______
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REVISED ________ DATE ______
APPROVED ________ DATE ______

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GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.33

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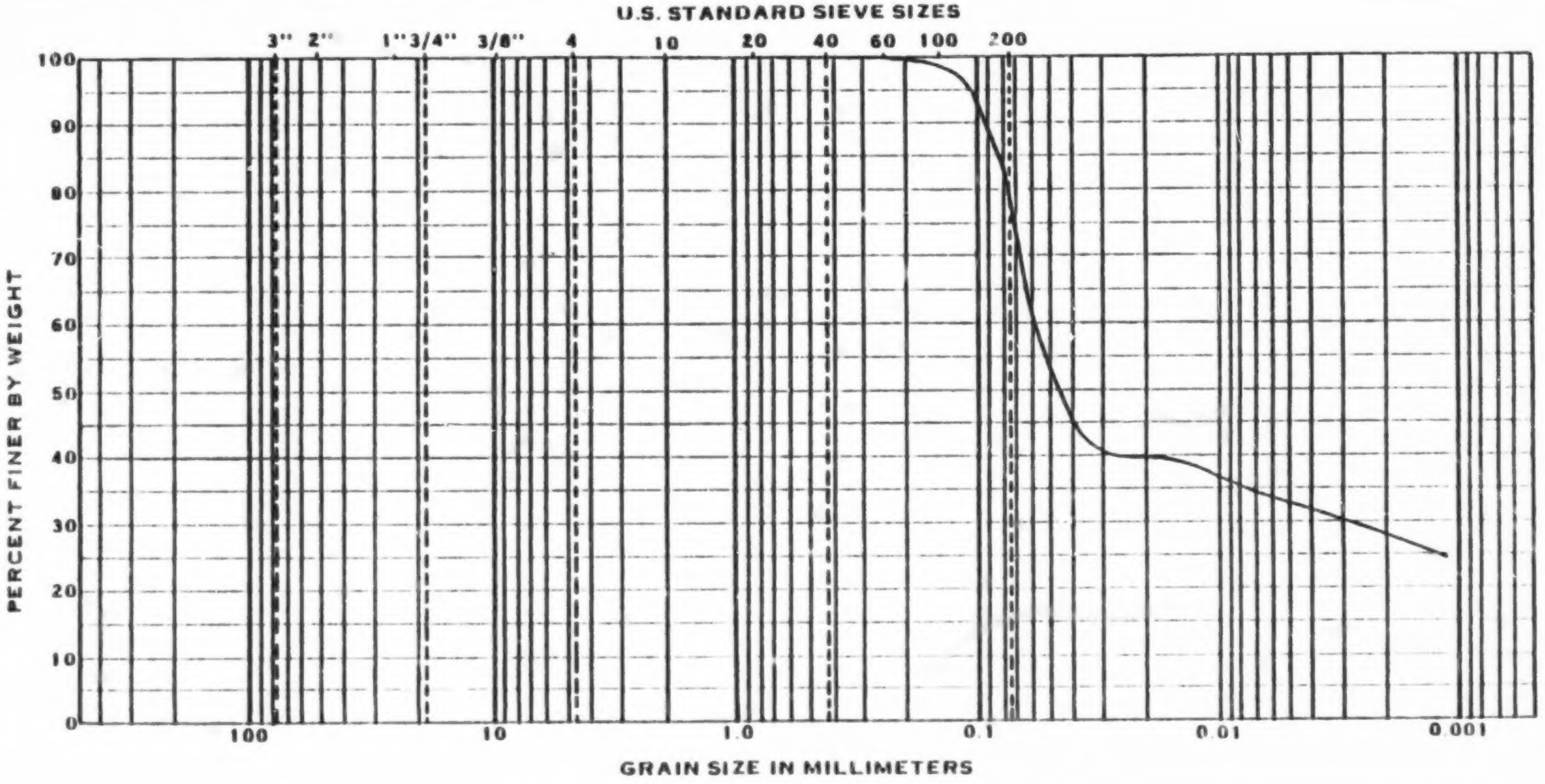
231



BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-202	29' - 30.5'				

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TABLE NO. B - 4.34

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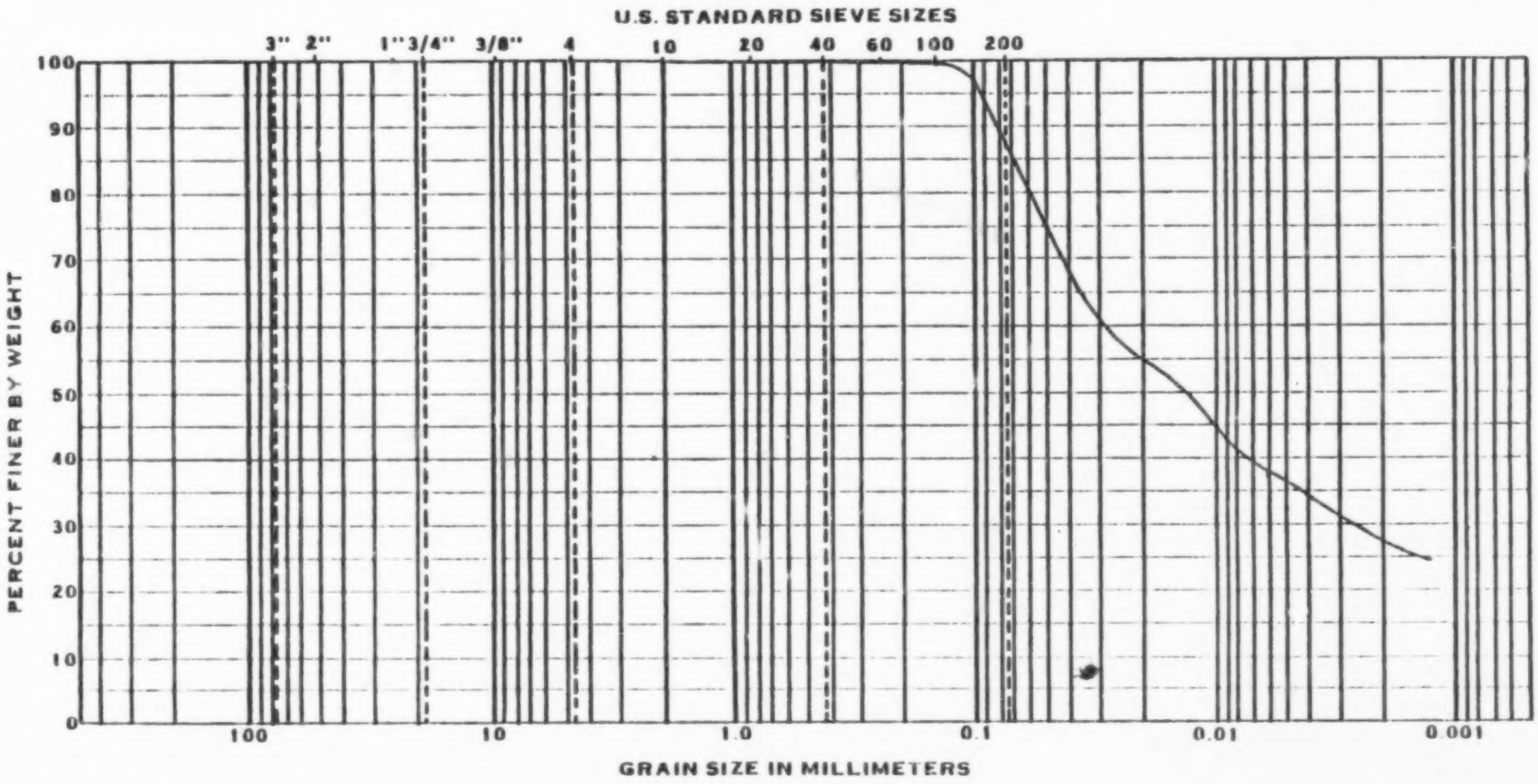

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-203	59' - 60 5'				

PREPARED ________ DATE ______
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REVISED ________ DATE ______
APPROVED ________ DATE ______

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CYPRESS CREEK DOME
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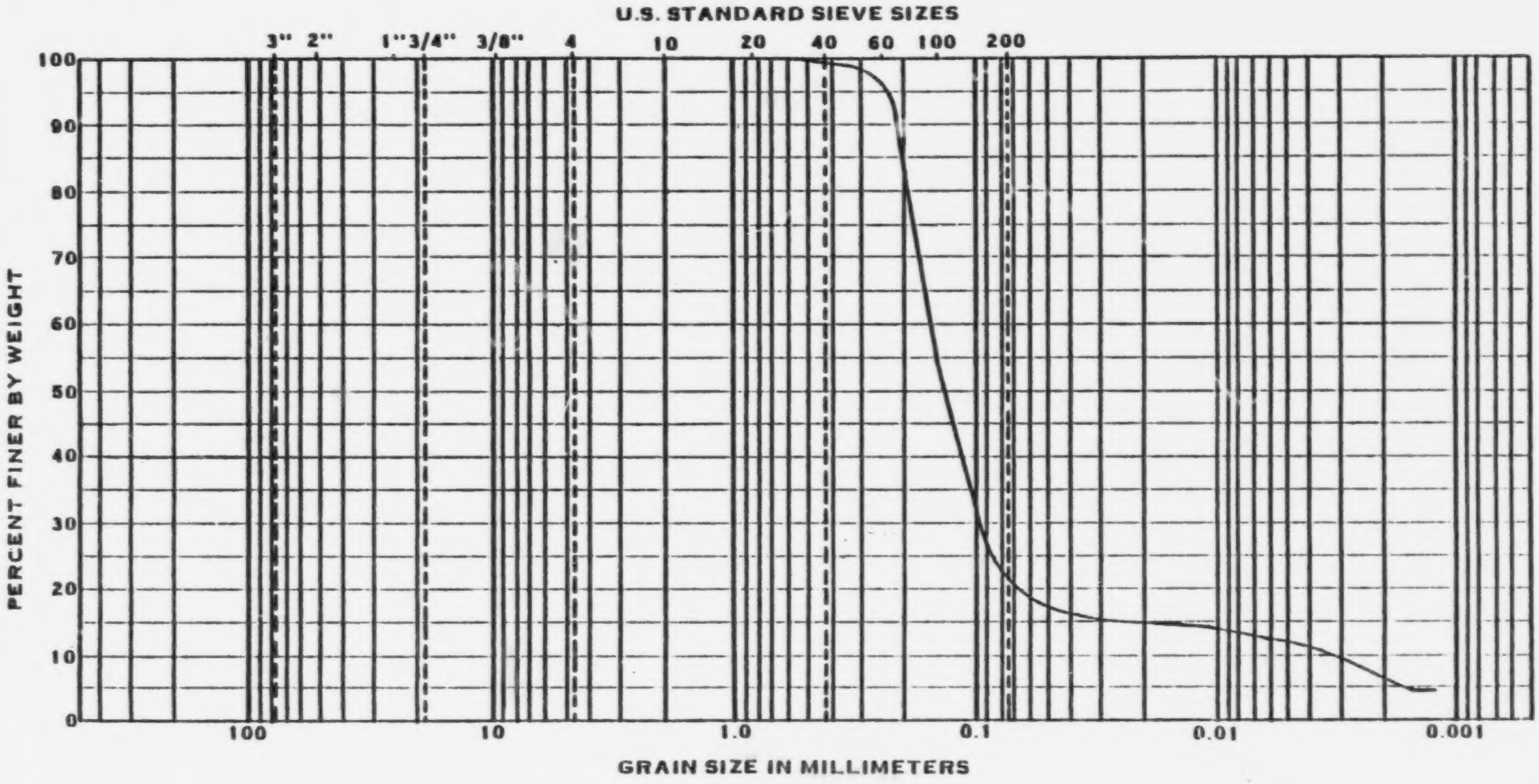
TABLE NO. B - 4.35



BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-203	99' - 100.5'				

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REVISED ______ DATE ______
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TABLE NO. B - 4.36

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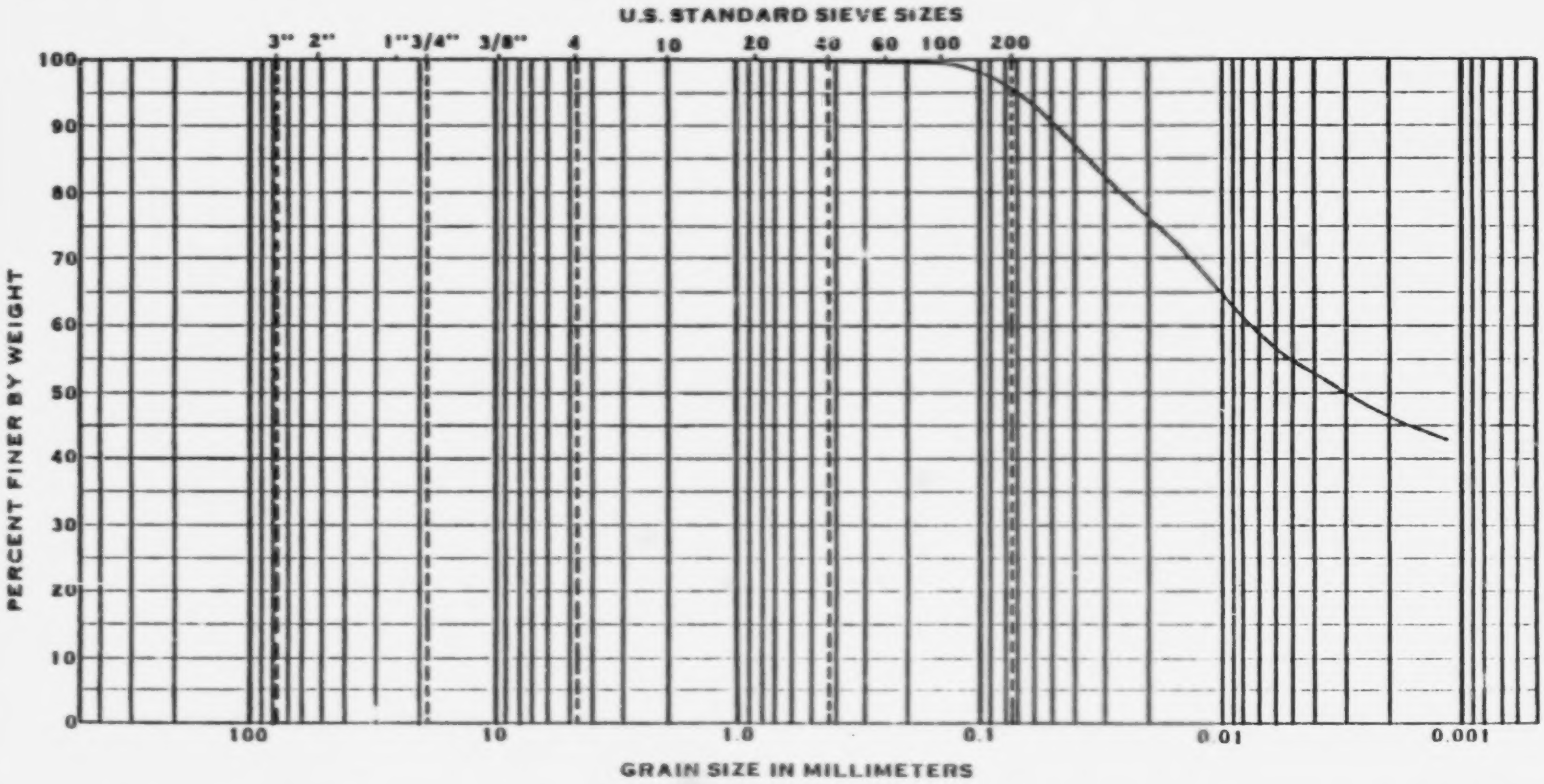

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-204	99' - 100.5'				

PREPARED ______ DATE ______
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REVISED ______ DATE ______
APPROVED ______ DATE ______

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TABLE NO. B - 4.37

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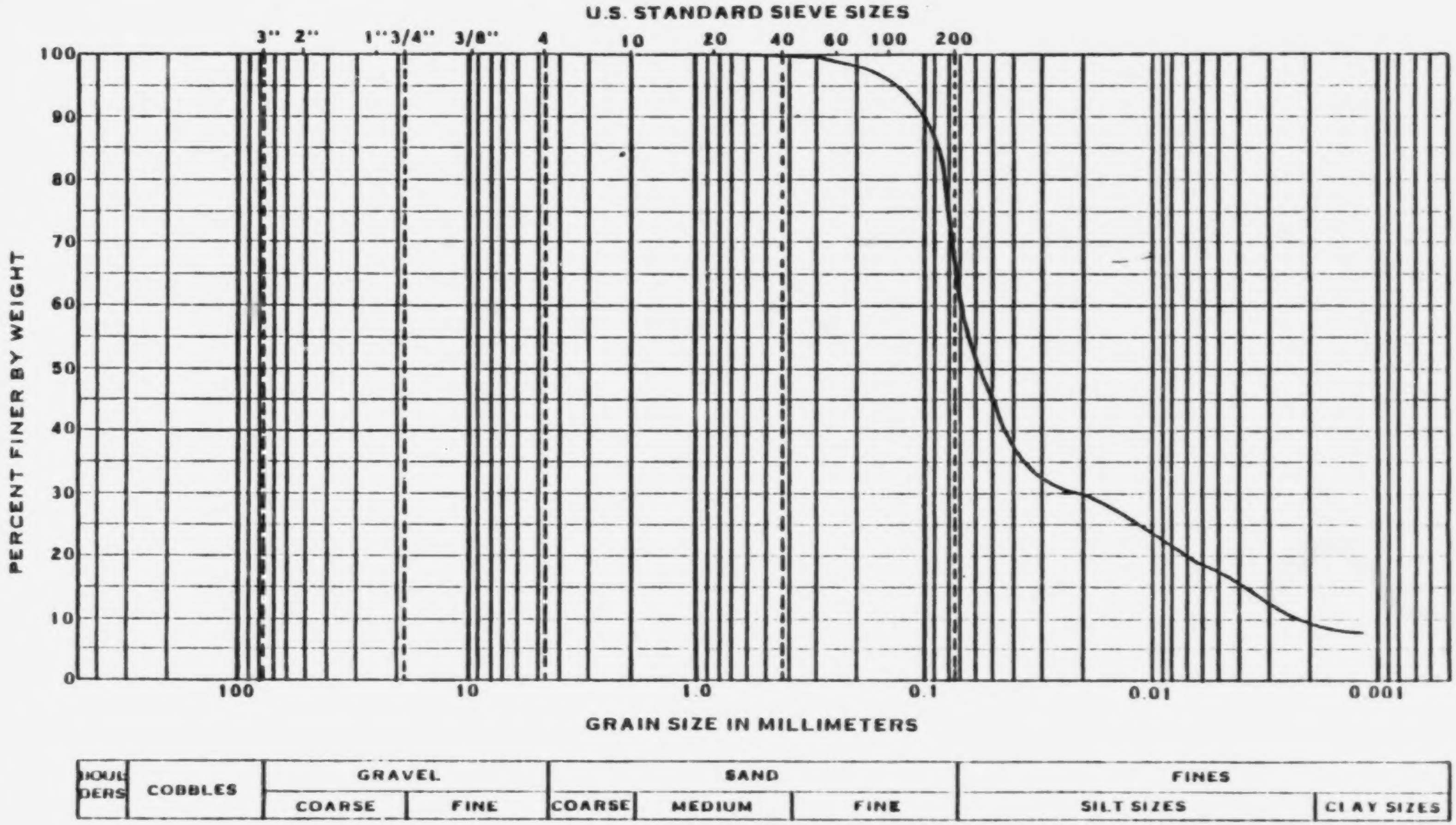

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-206	109' - 110.5'				

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
APPROVED ________ DATE ______

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TABLE NO. B - 4.38

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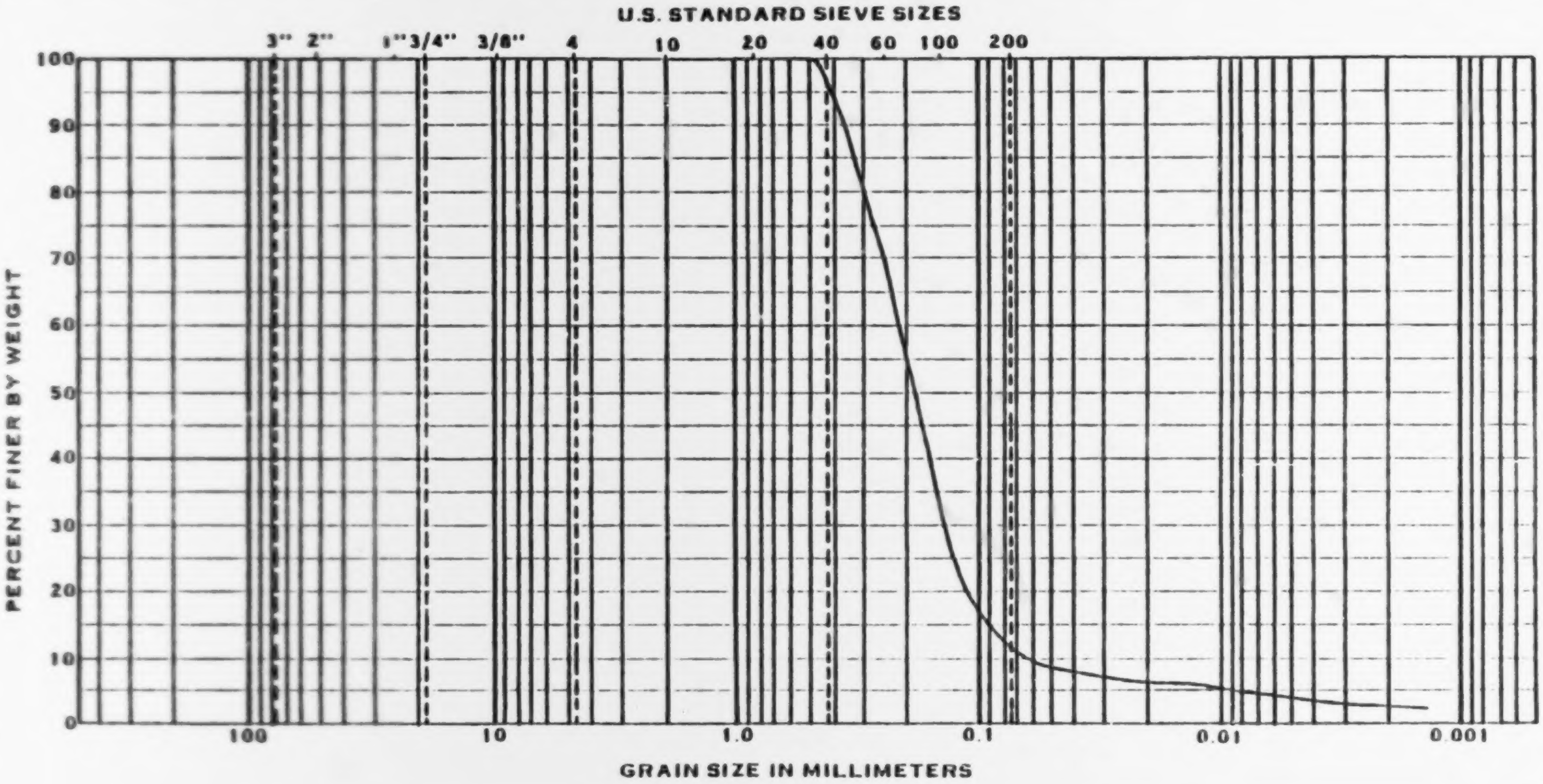

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-207	179' - 180.5'				

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
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TABLE NO. B - 4.39

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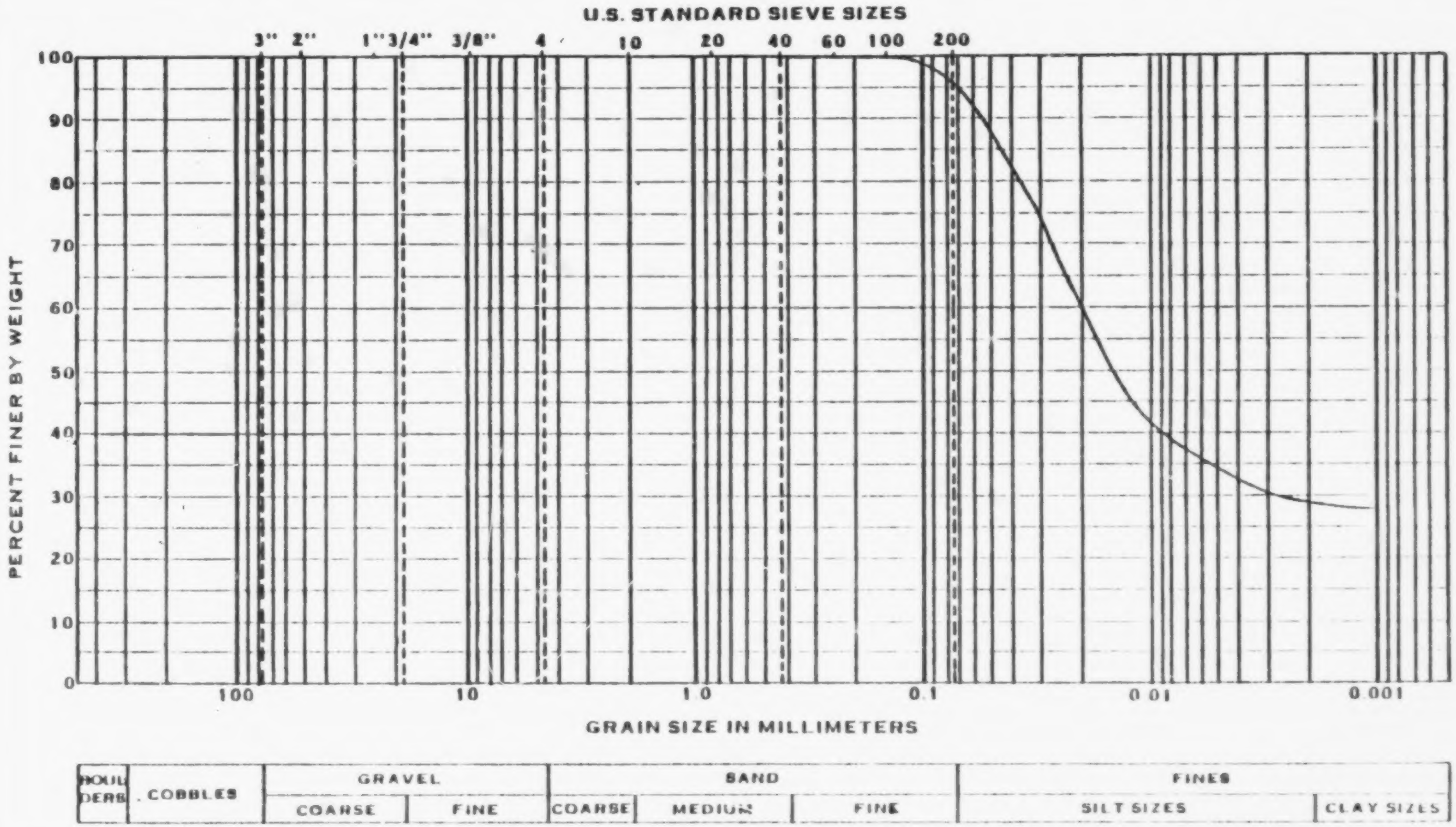

BORING NO	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-208	74' - 75.5'				

PREPARED ______ DATE ______
REVISED ______ DATE ______
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TABLE NO. B-4.40

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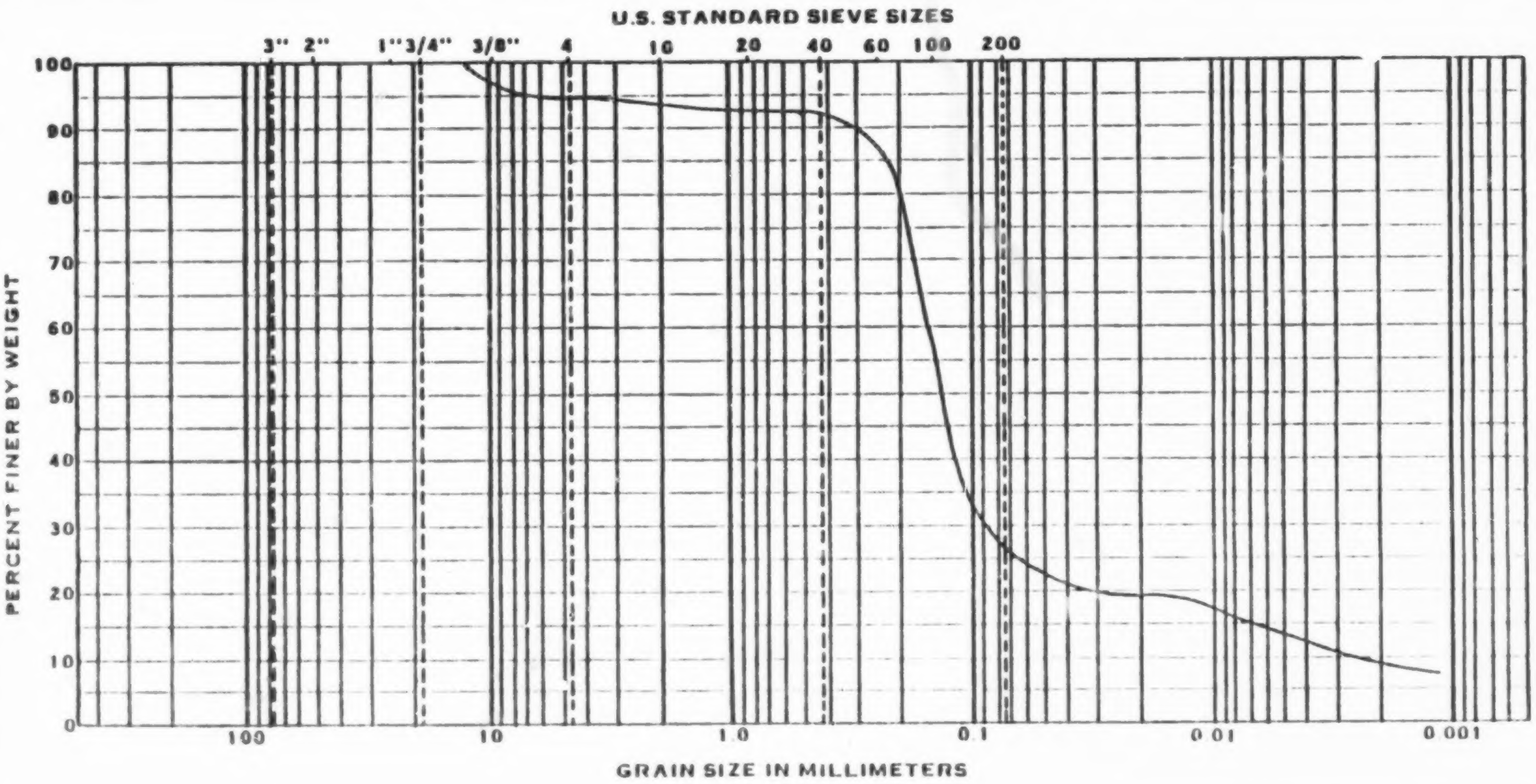

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-209	24' - 25.5'				

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
APPROVED ________ DATE ______

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TABLE NO. B - 4.41

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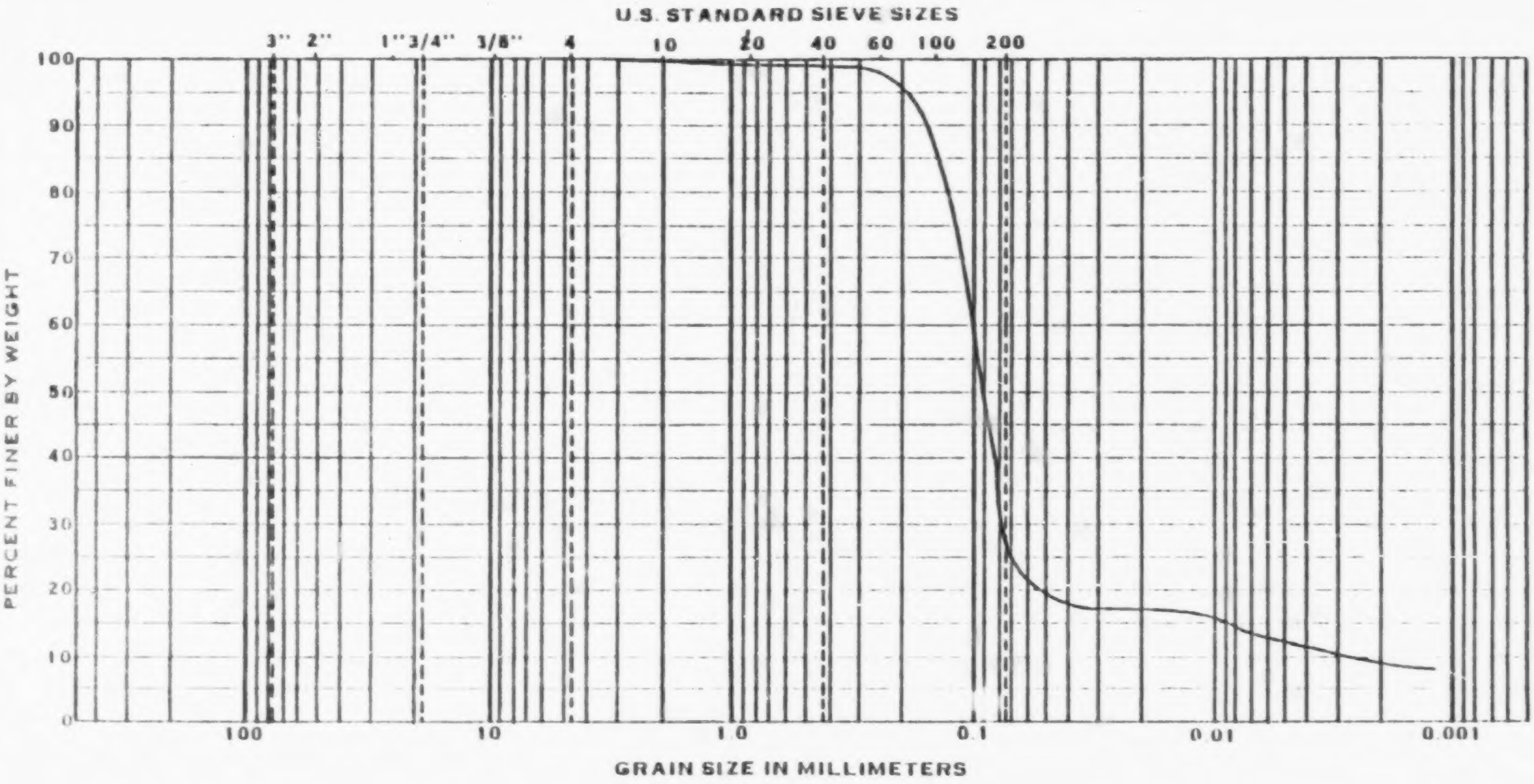

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-209	74' - 75.5'				

PREPARED ________ DATE ________
REVISED ________ DATE ________
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APPROVED ________ DATE ________

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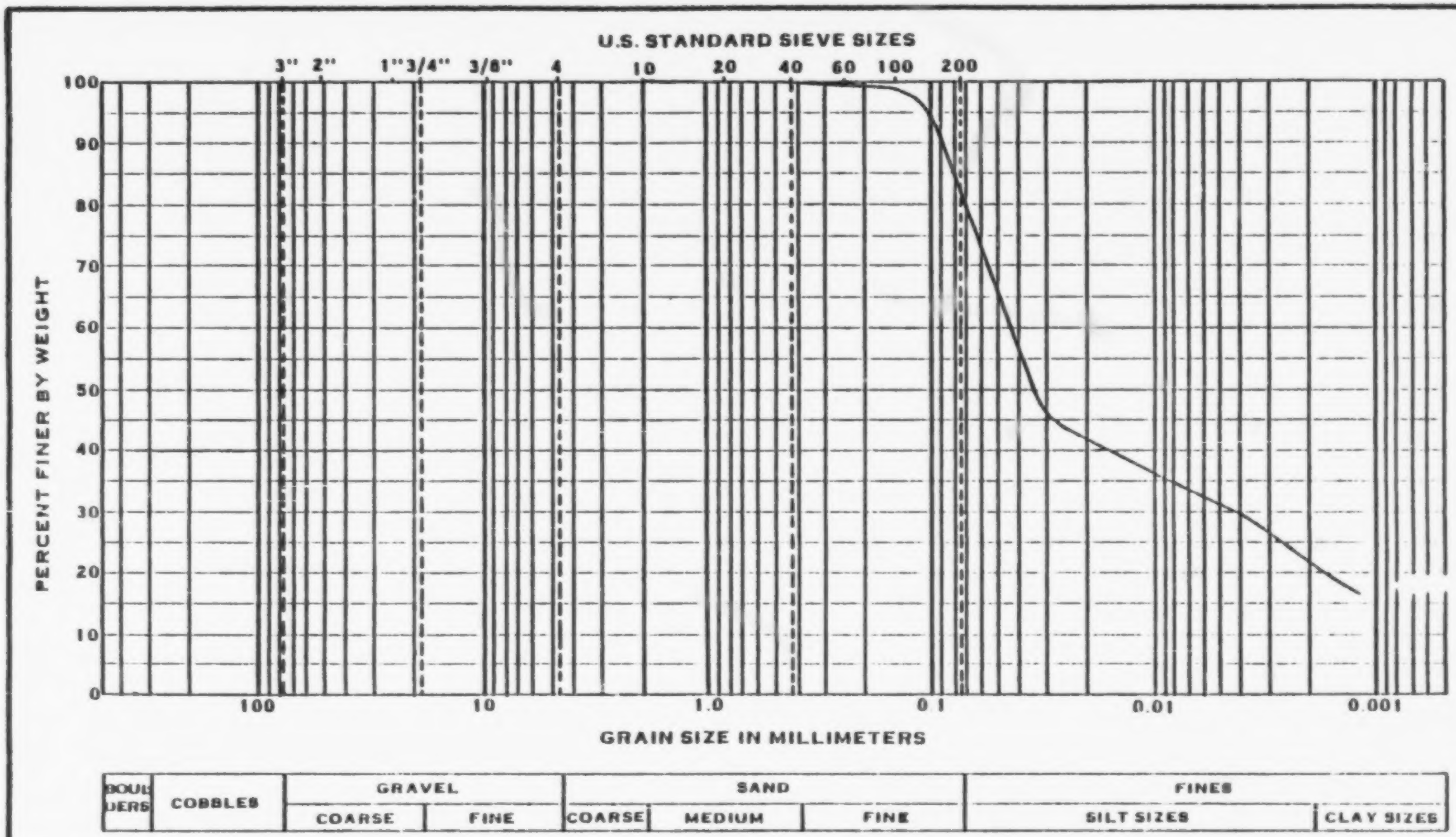
TABLE NO. B - 4.42

240



BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-210	54' - 55.5'				

PREPARED ______ DATE ____
REVISED ______ DATE ____
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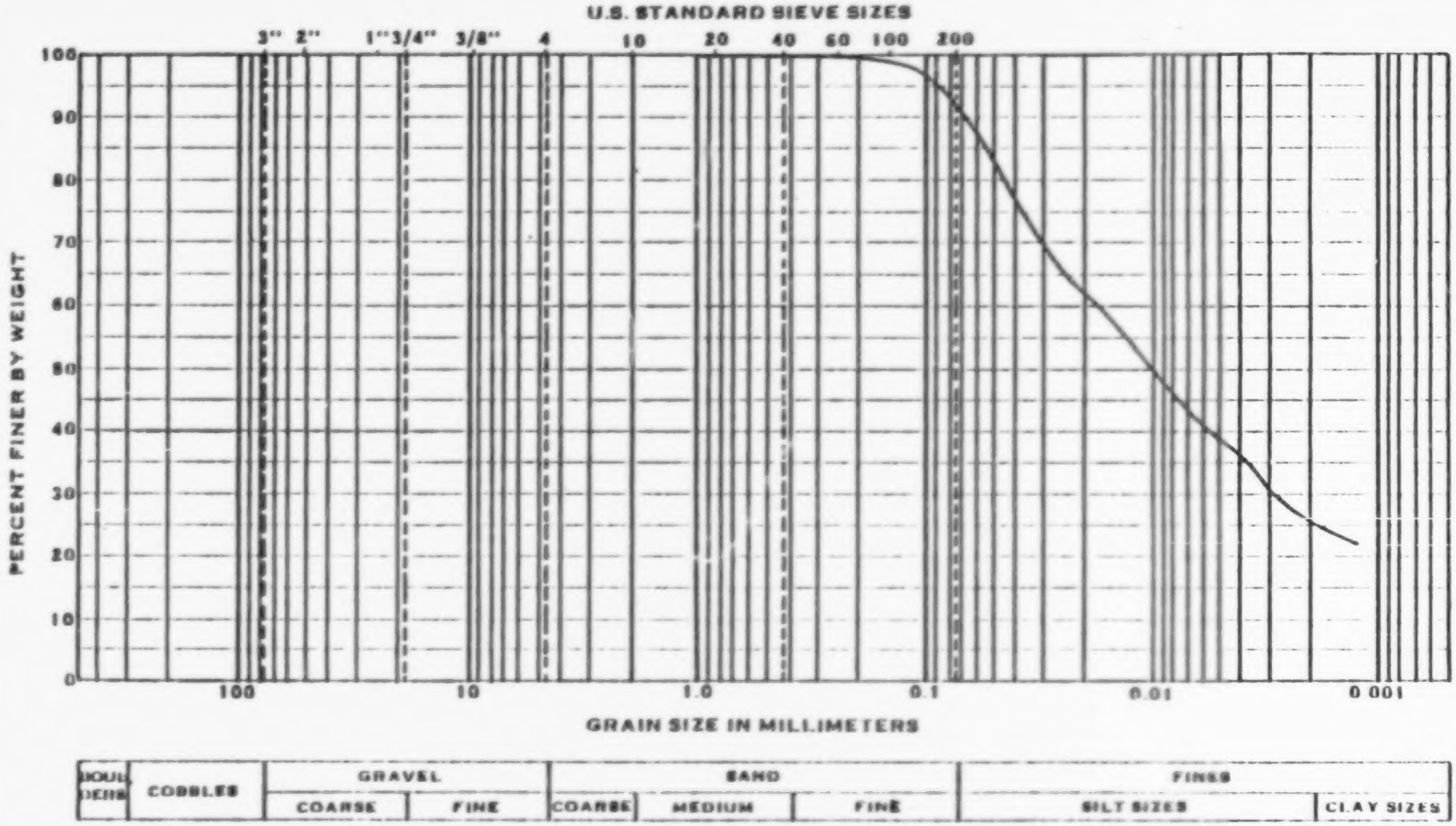
CYPRESS CREEK DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.43



BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-210	178' - 180.5'				

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

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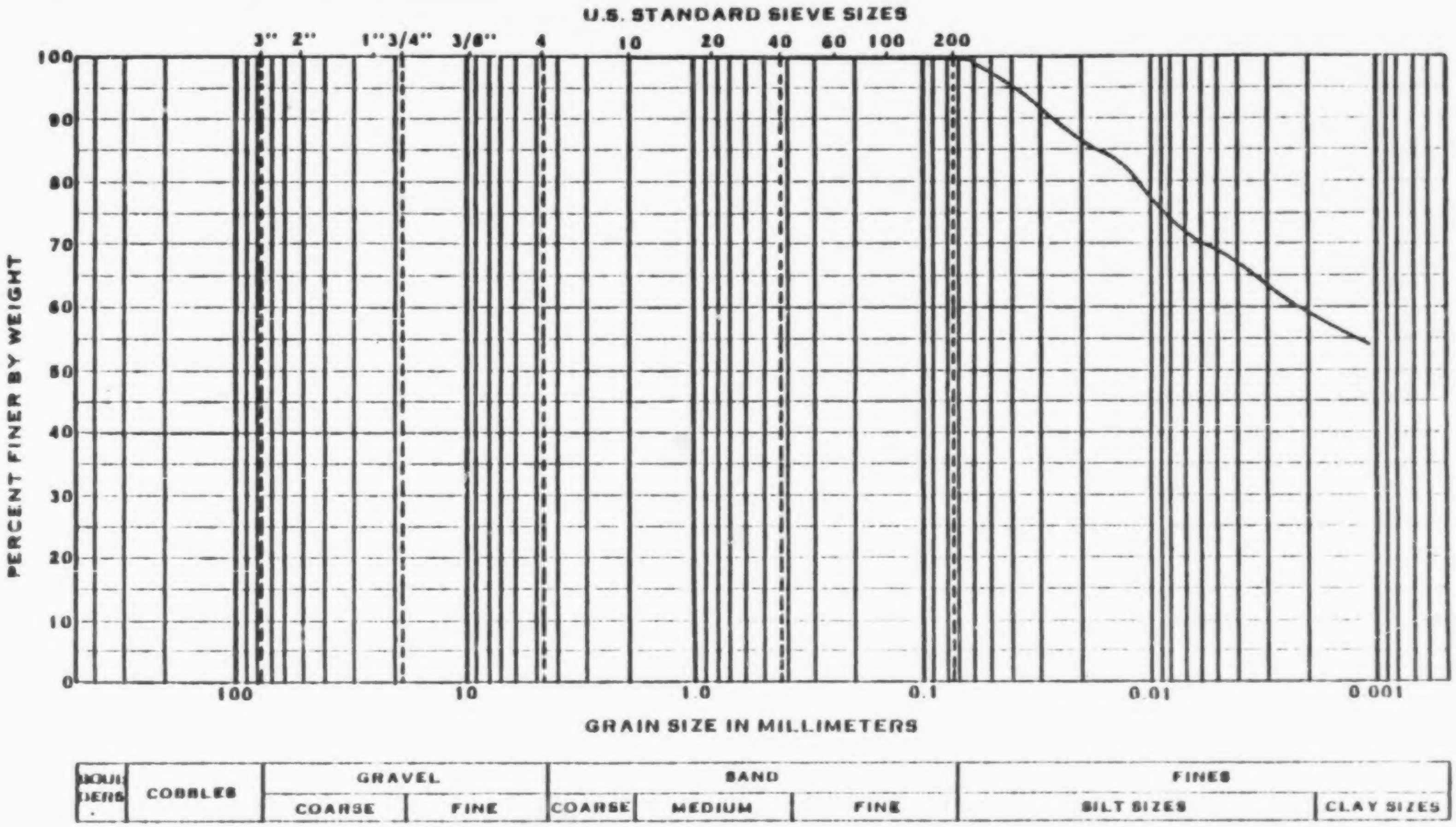
TABLE NO. B - 4.44

242



BORING NO	ELEV. OR DEPTH	NAT W%	LL	PL	PI
MCCG-211	19' - 20.5'				

PREPARED .... DATE ......

REVISED .... DATE ......

REVISED .... DATE ......

APPROVED .... DATE ......

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TABLE NO. B - 4.45

243

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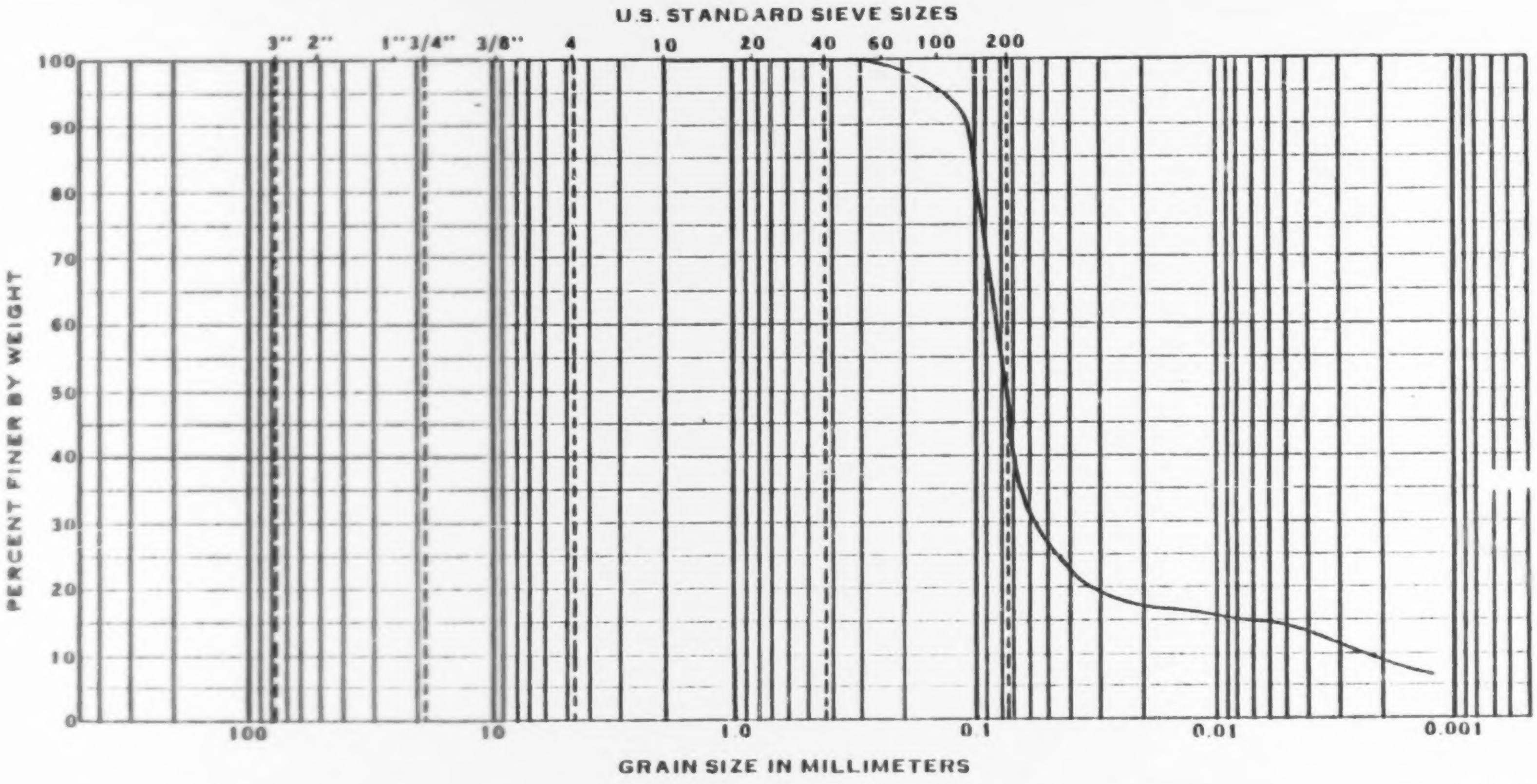

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-211	129' - 130.5'				

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
APPROVED ________ DATE ______

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TABLE NO. B-4.46

244

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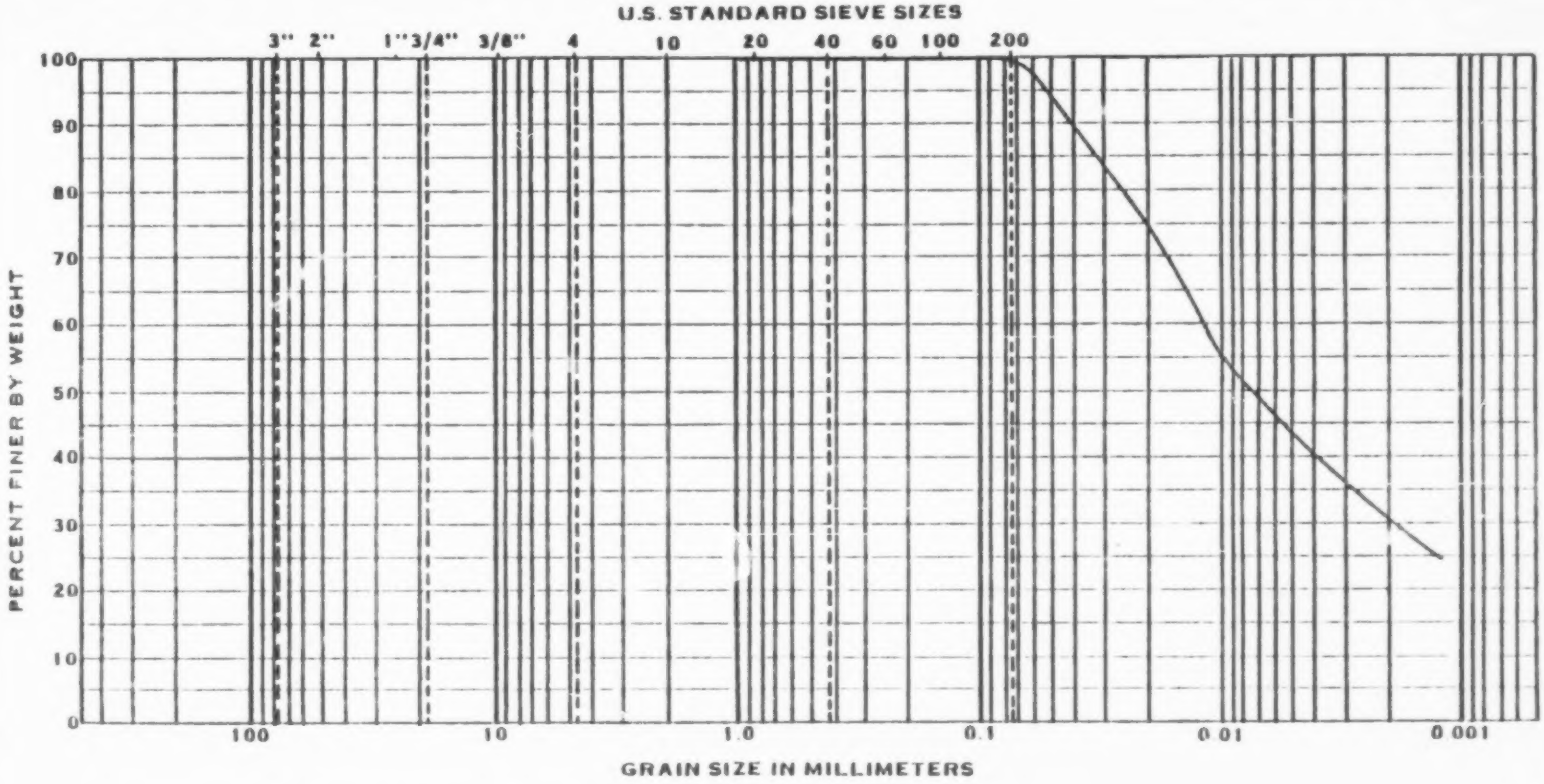

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-212	74' - 75.5'				

PREPARED ________ DATE ____
REVISED ________ DATE ____
REVISED ________ DATE ____
APPROVED ________ DATE ____

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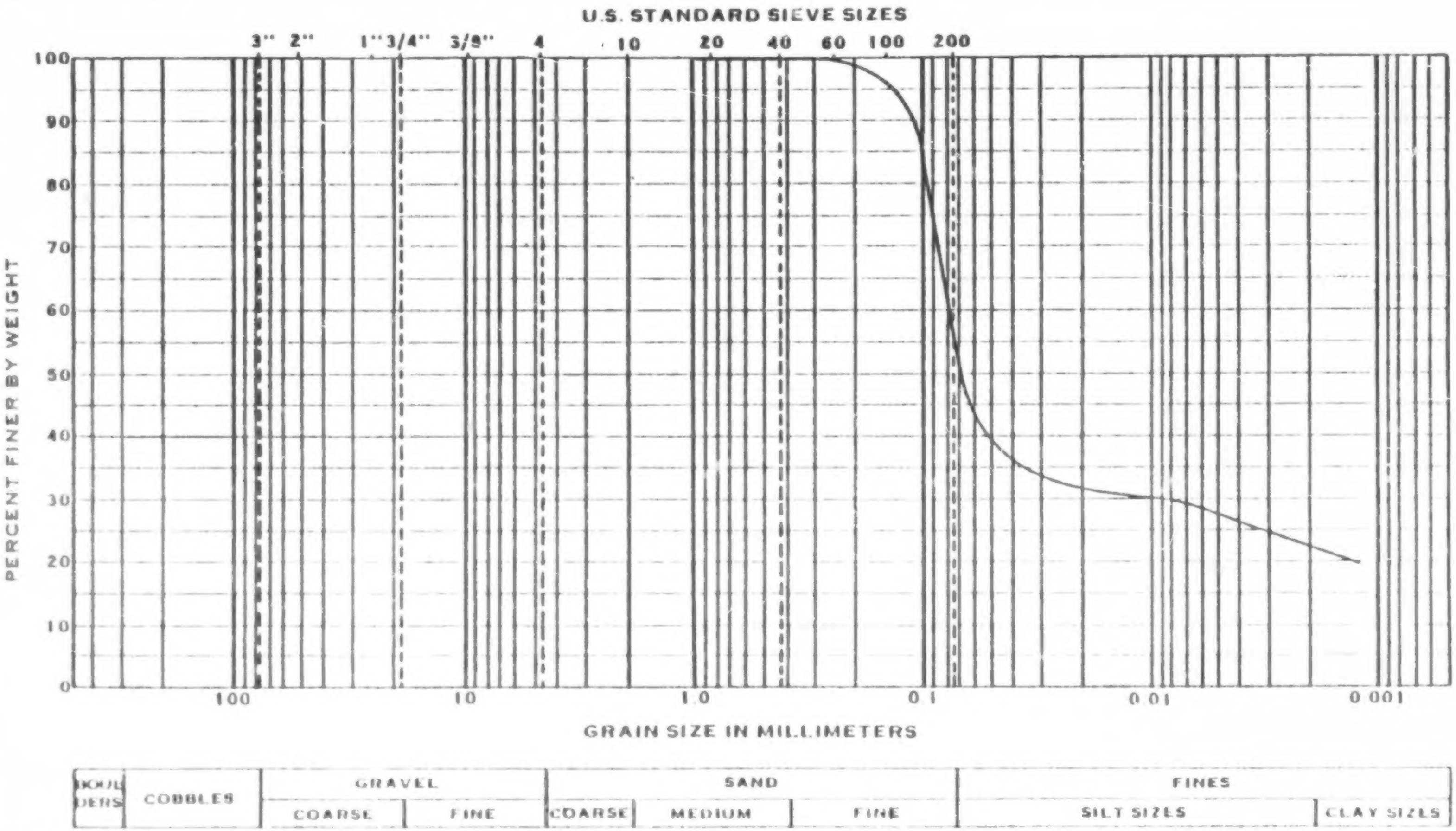
TABLE NO. B - 4.47



BORING NO	ELEV OR DEPTH	NAT WC	LL	PL	PI
MCCG 217	119' - 120.5'				

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

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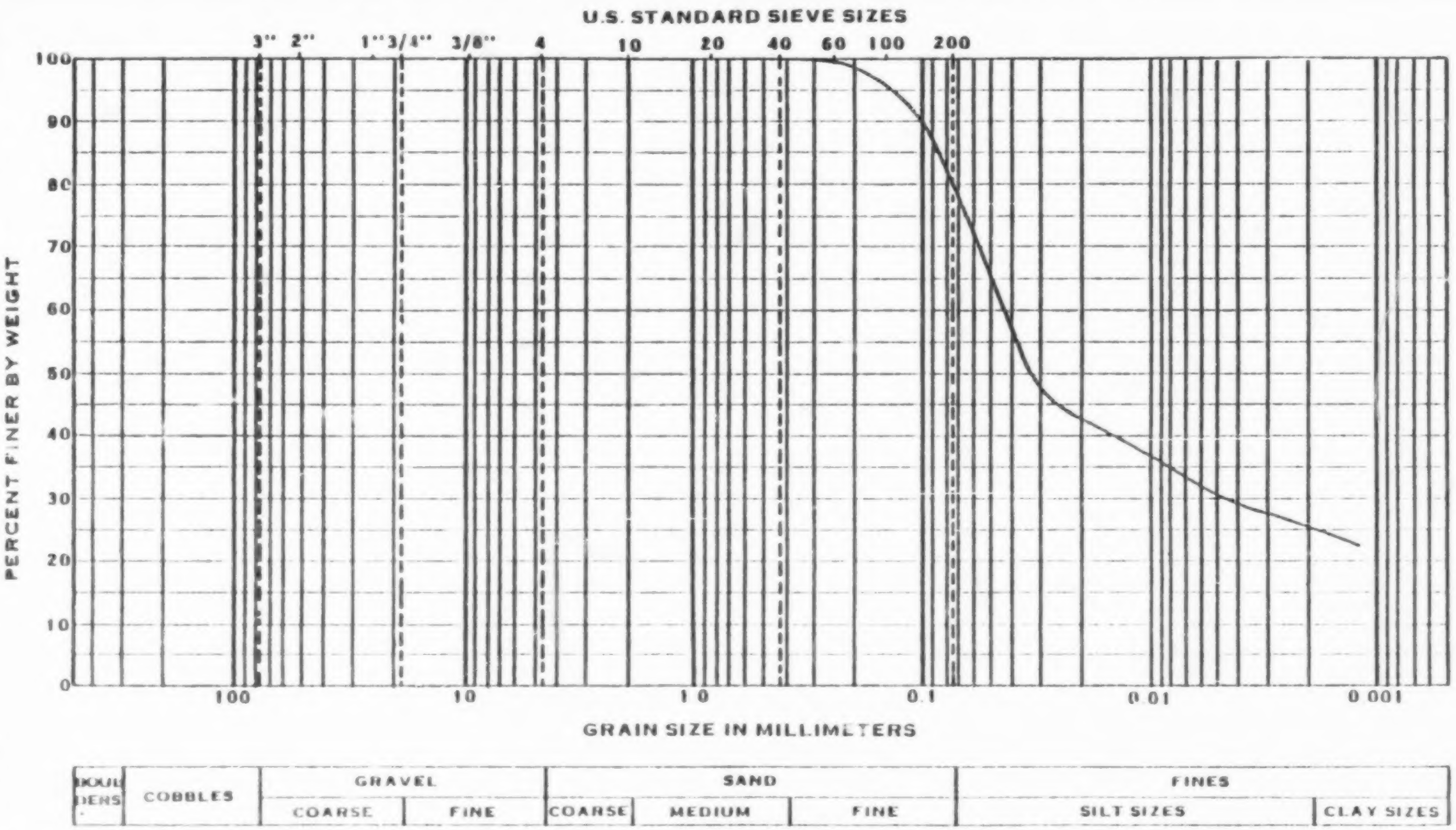
TABLE NO. B - 4.48

246



BORING NO	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG 217	139' - 140.5'				

PREPARED ________ DATE ________
REVISED ________ DATE ________
REVISED ________ DATE ________
APPROVED ________ DATE ________

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TABLE NO B - 4.49

247

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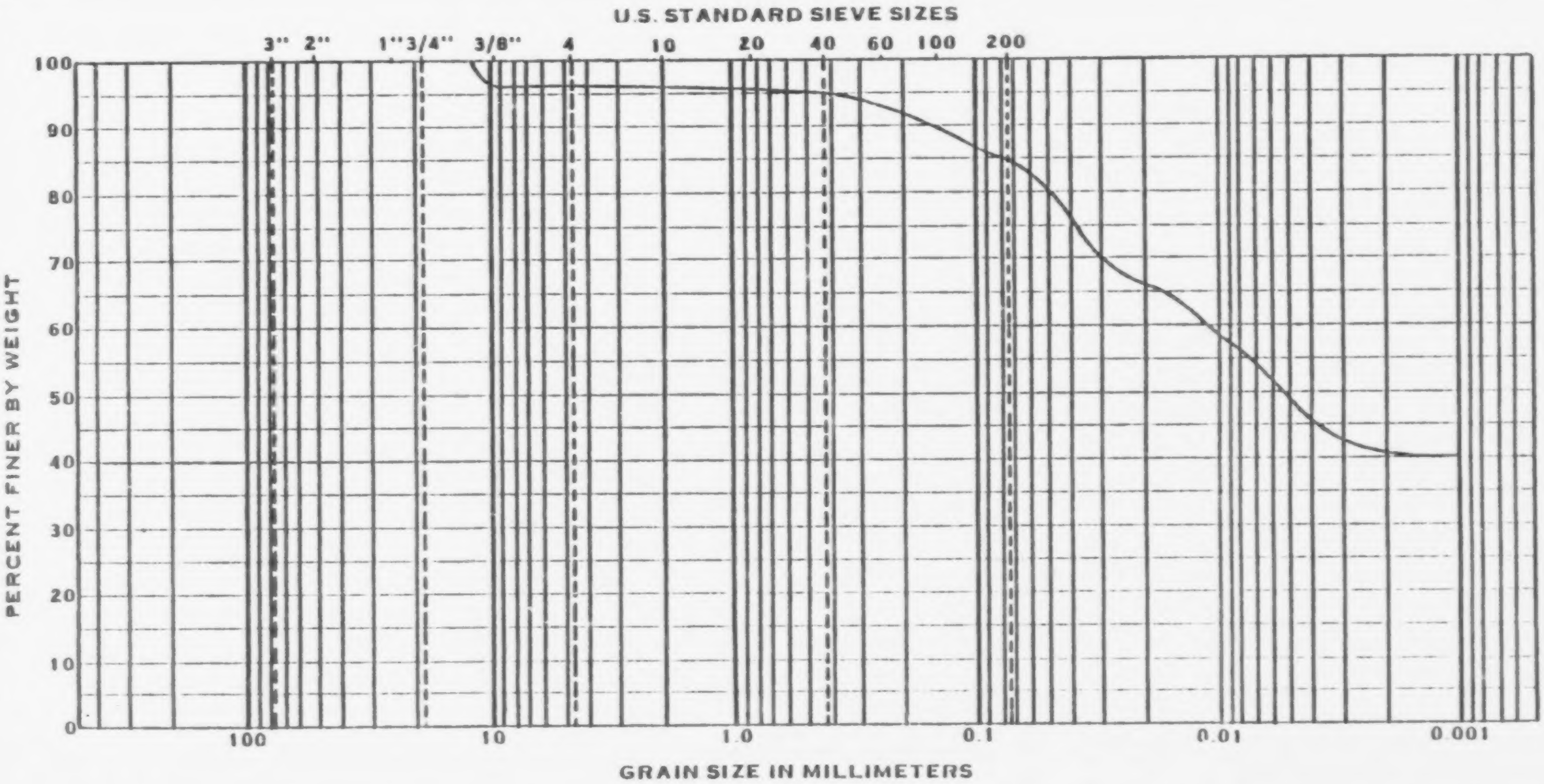

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-218	14' - 15.5'				

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
APPROVED ________ DATE ______

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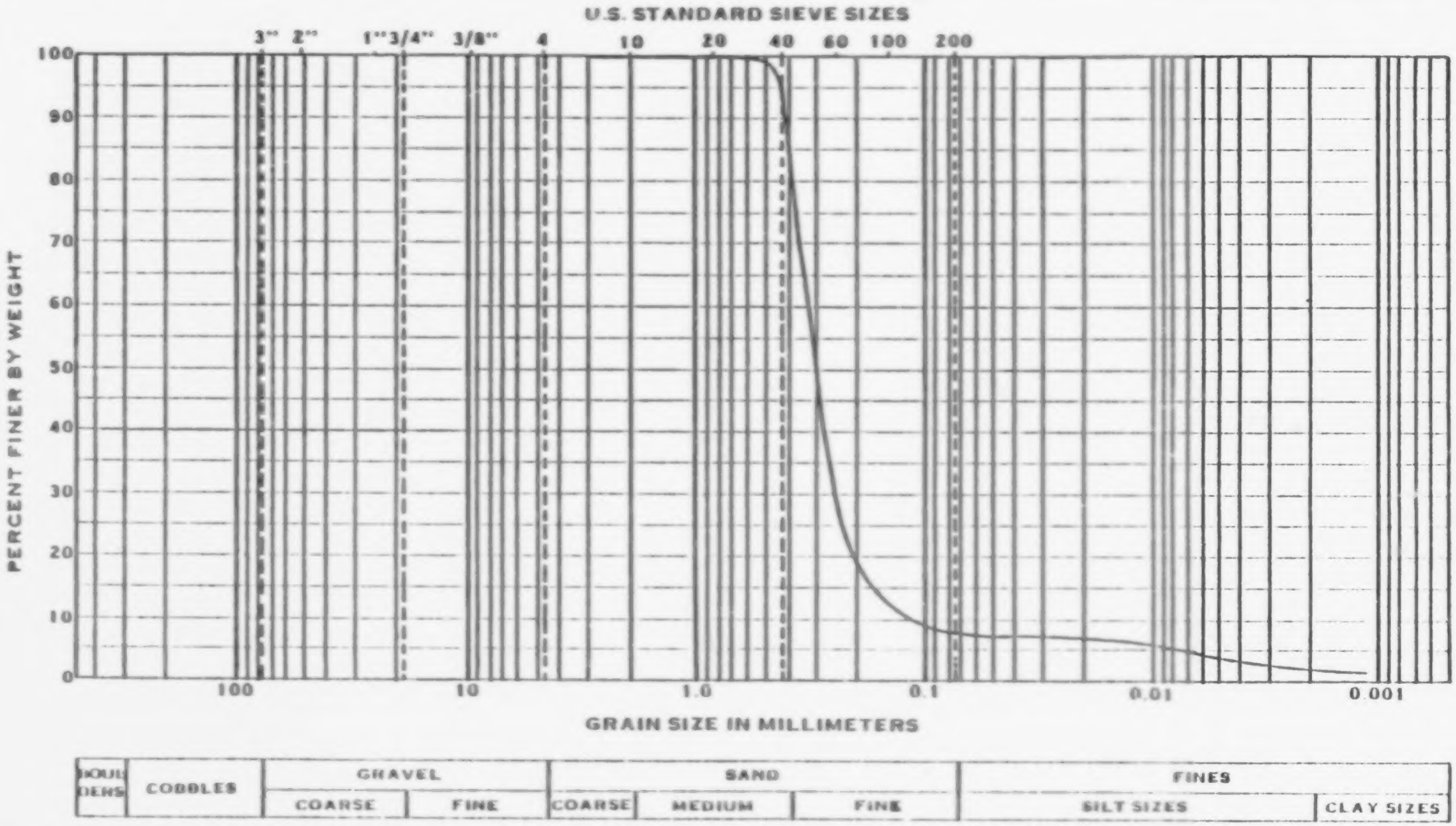
CYPRESS CREEK DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.50



BORING NO	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-218	49' - 50.5'				

PREPARED ________ DATE ____
REVISED ________ DATE ____
REVISED ________ DATE ____
APPROVED ________ DATE ____

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TABLE NO. B - 4.51

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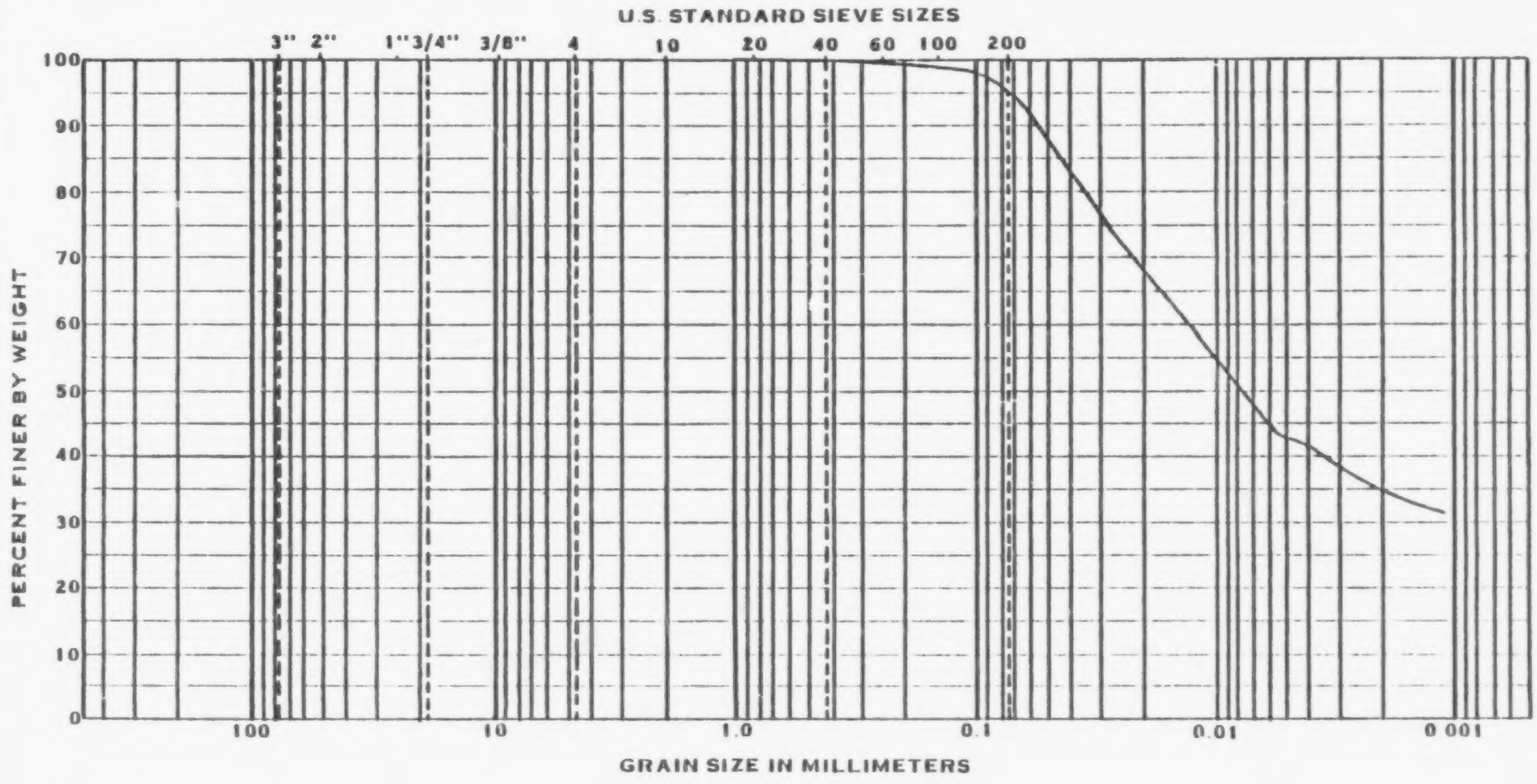

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-218	89' - 90.5'				

PREPARED ________ DATE ____
REVISED ________ DATE ____
REVISED ________ DATE ____
APPROVED ________ DATE ____

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TABLE NO. B - 4.52

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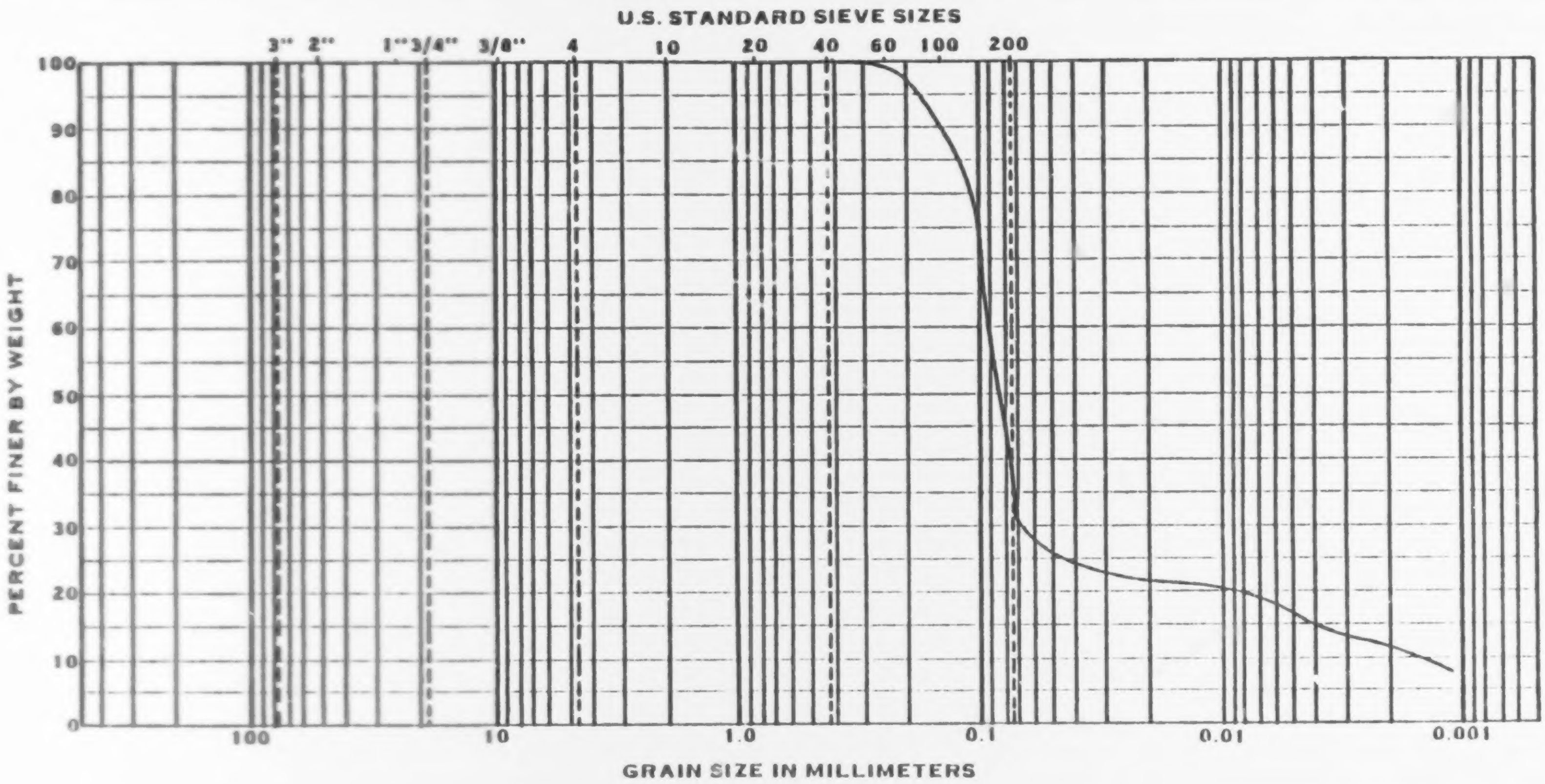

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-219	38.5' - 40'				

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
APPROVED ________ DATE ______

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TABLE NO. B - 4 53

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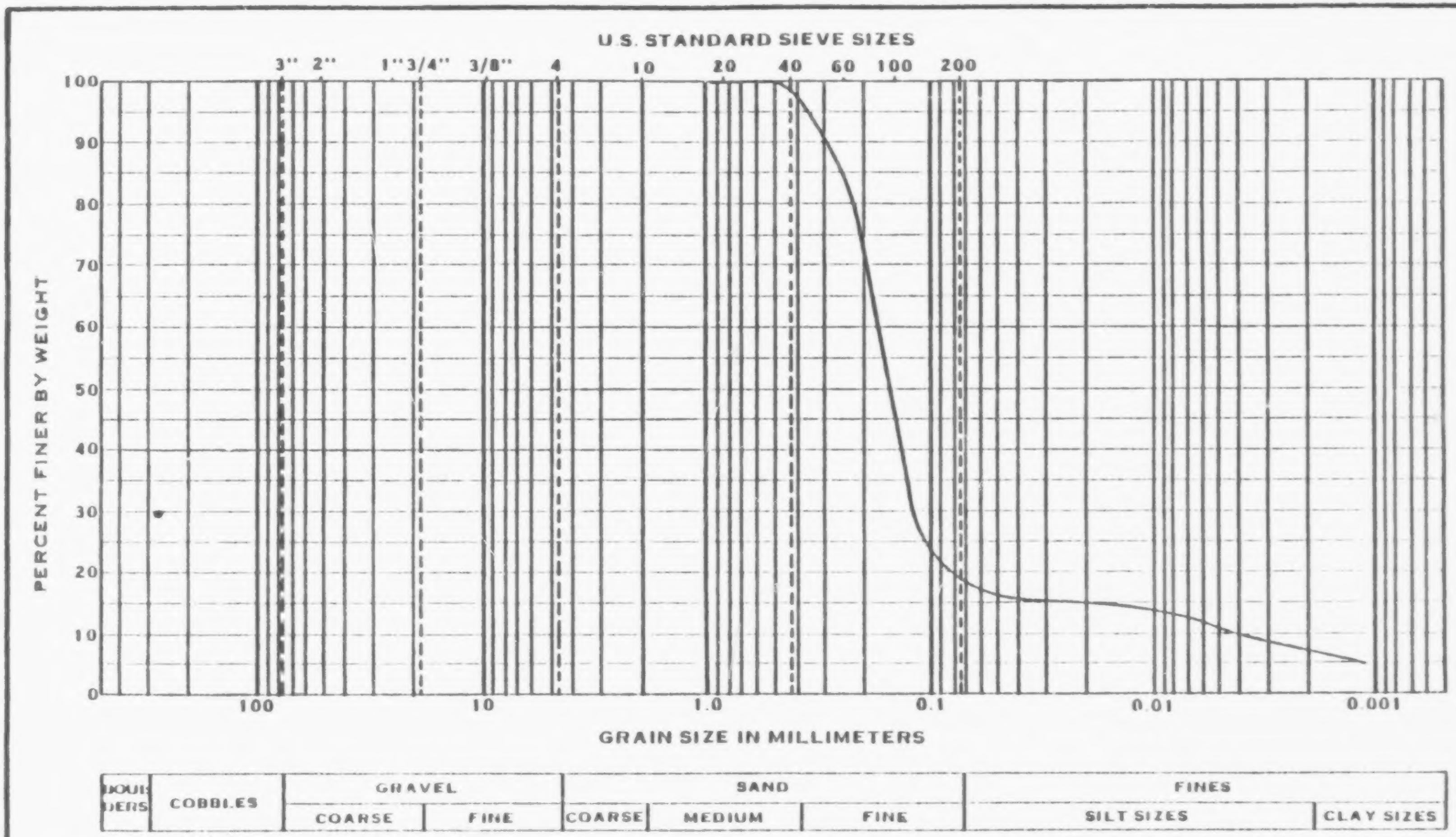

BORING NO	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-219	58.5' - 60'				

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
APPROVED ________ DATE ______

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TABLE NO. B - 4.54

252

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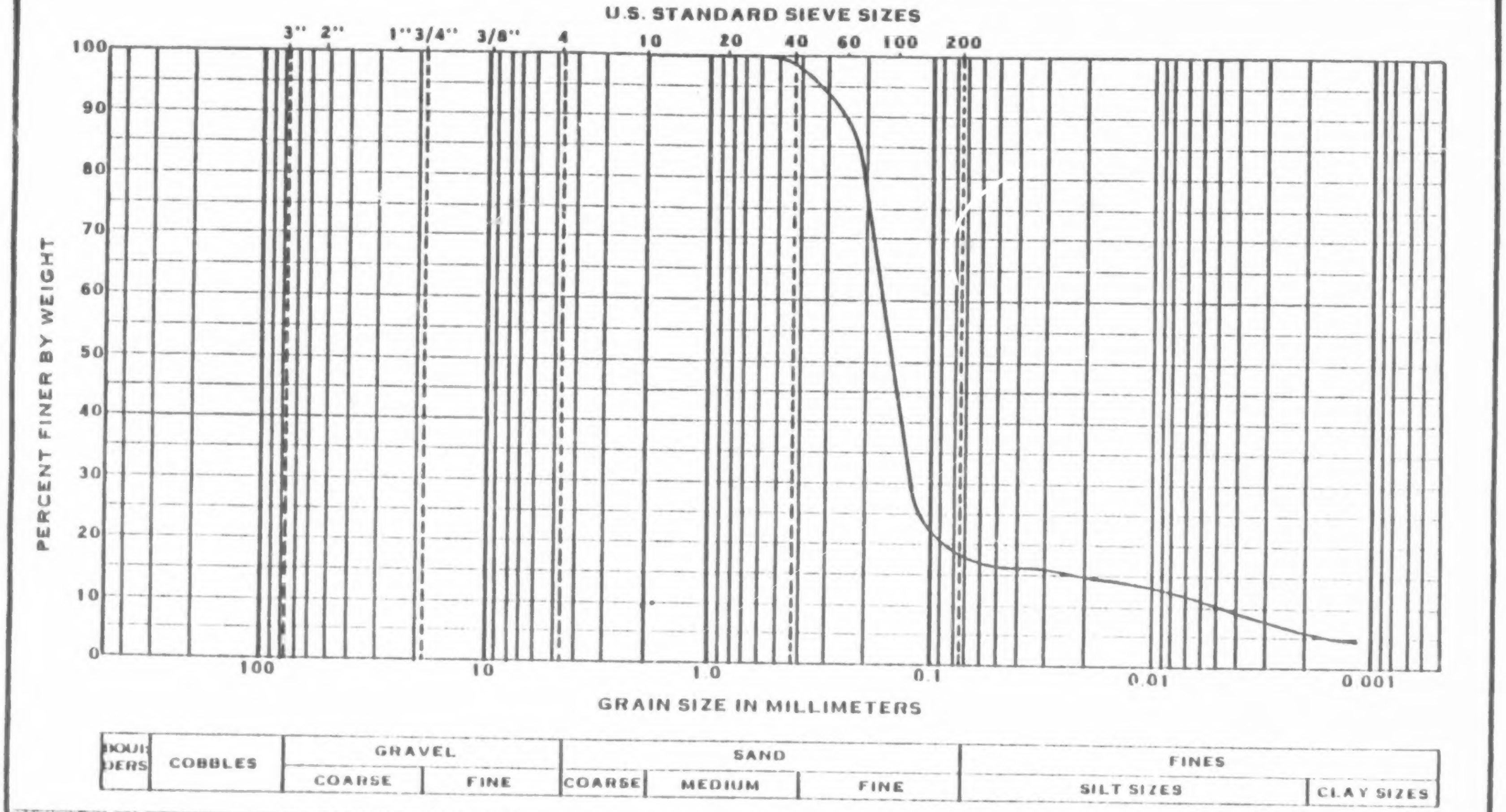

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-219	83.5' - 85'				

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

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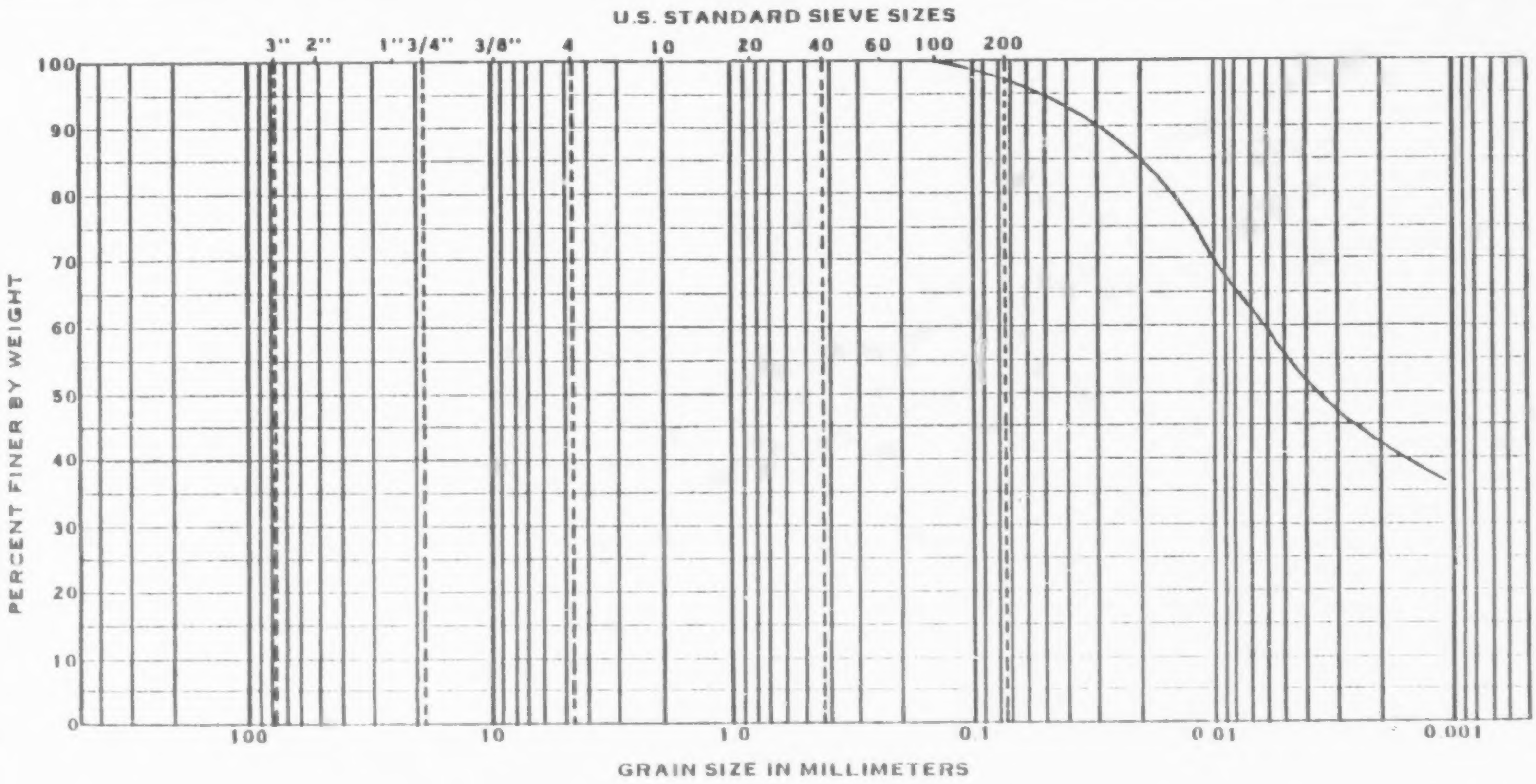
TABLE NO. B - 4.55



BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-219	139' - 140.5'				

PREPARED ________ DATE ________
REVISED ________ DATE ________
REVISED ________ DATE ________
APPROVED ________ DATE ________

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TABLE NO. B - 4.56

254

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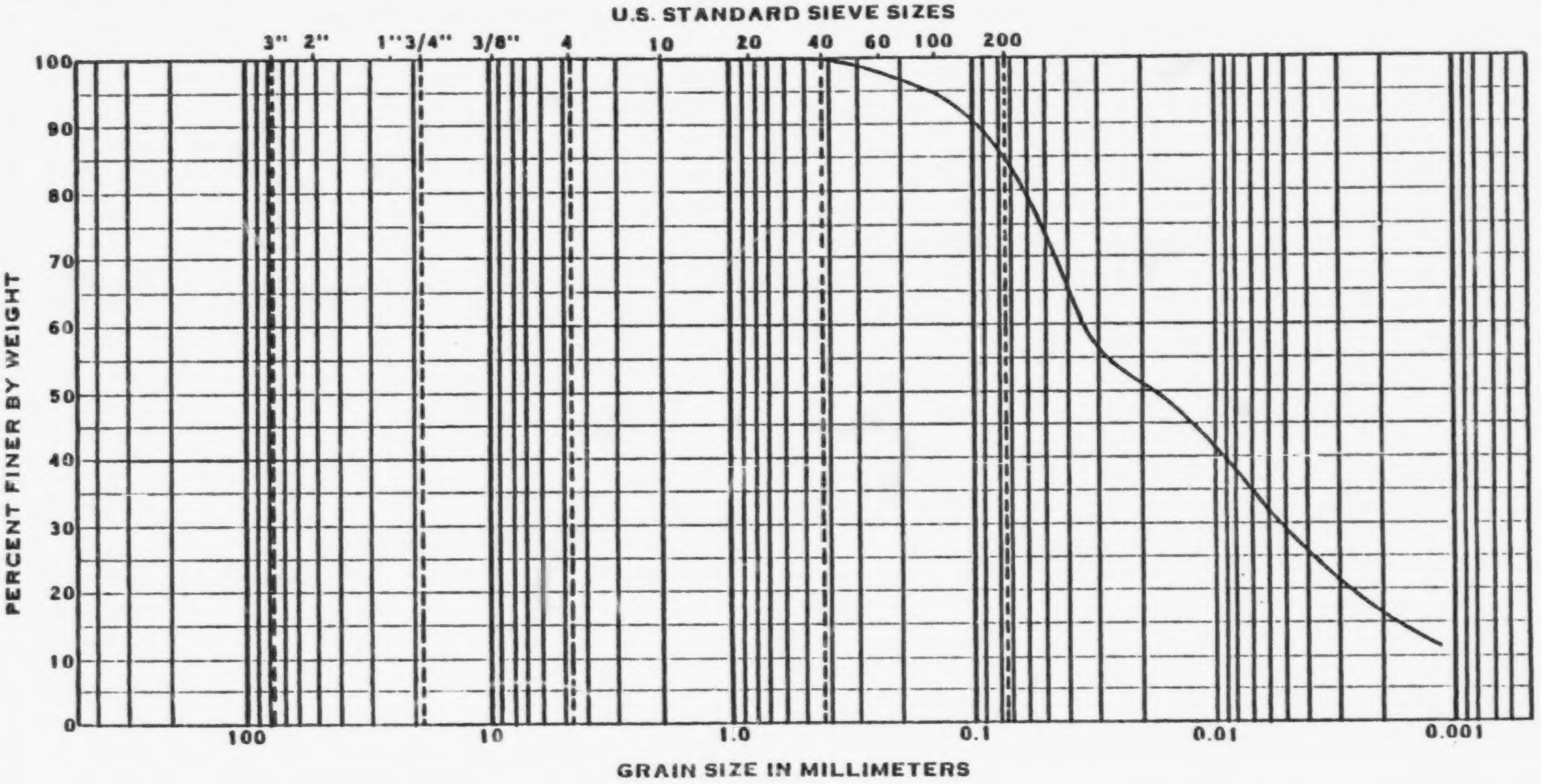

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG - 220	49' - 50.5'				

PREPARED______ DATE_____
REVISED______ DATE_____
REVISED______ DATE_____
APPROVED______ DATE_____

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GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.57

255

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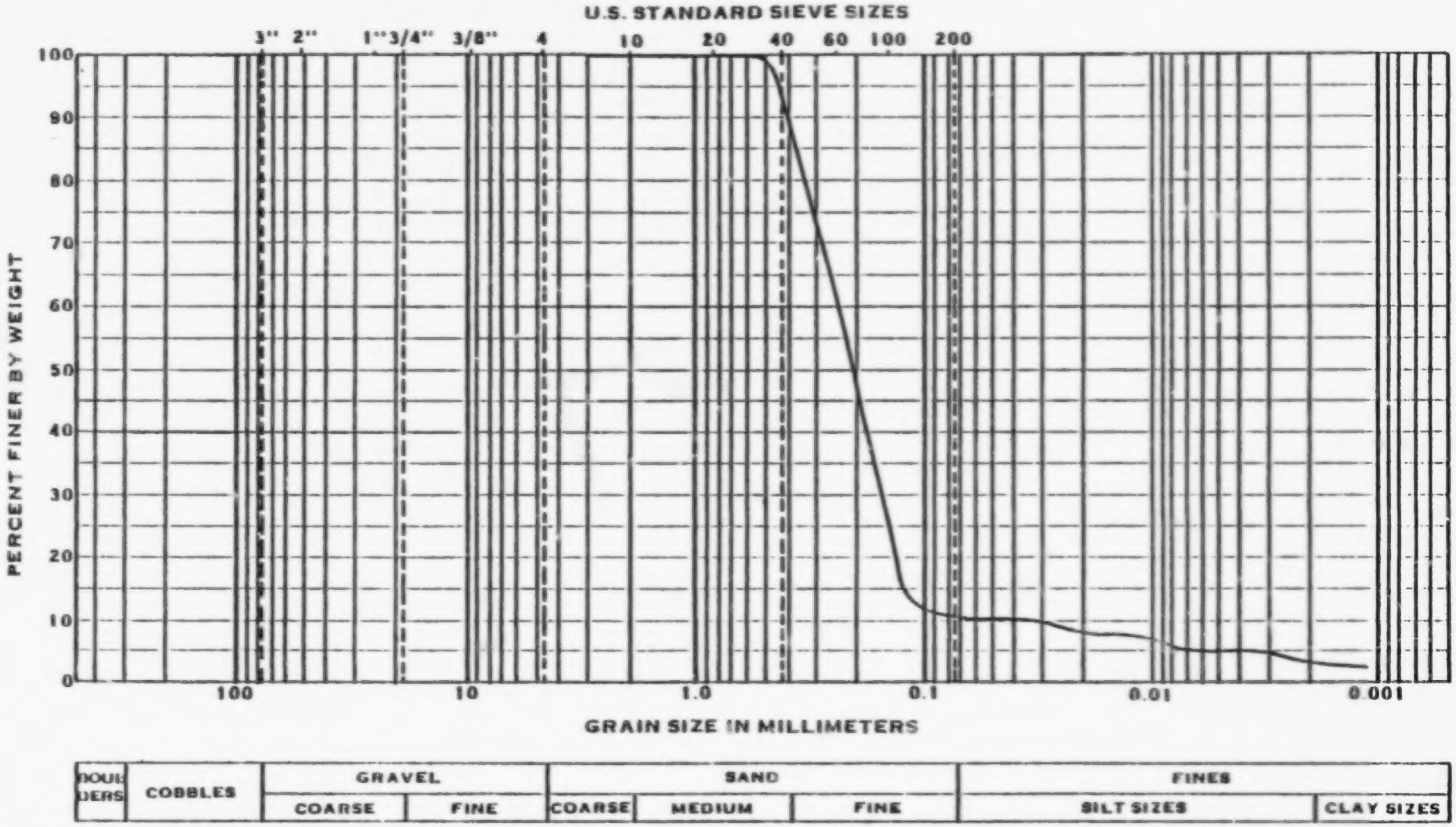

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-220	79' - 80.5'				

PREPARED _______ DATE _____
REVISED _______ DATE _____
REVISED _______ DATE _____
APPROVED _______ DATE _____

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CYPRESS CREEK DOME
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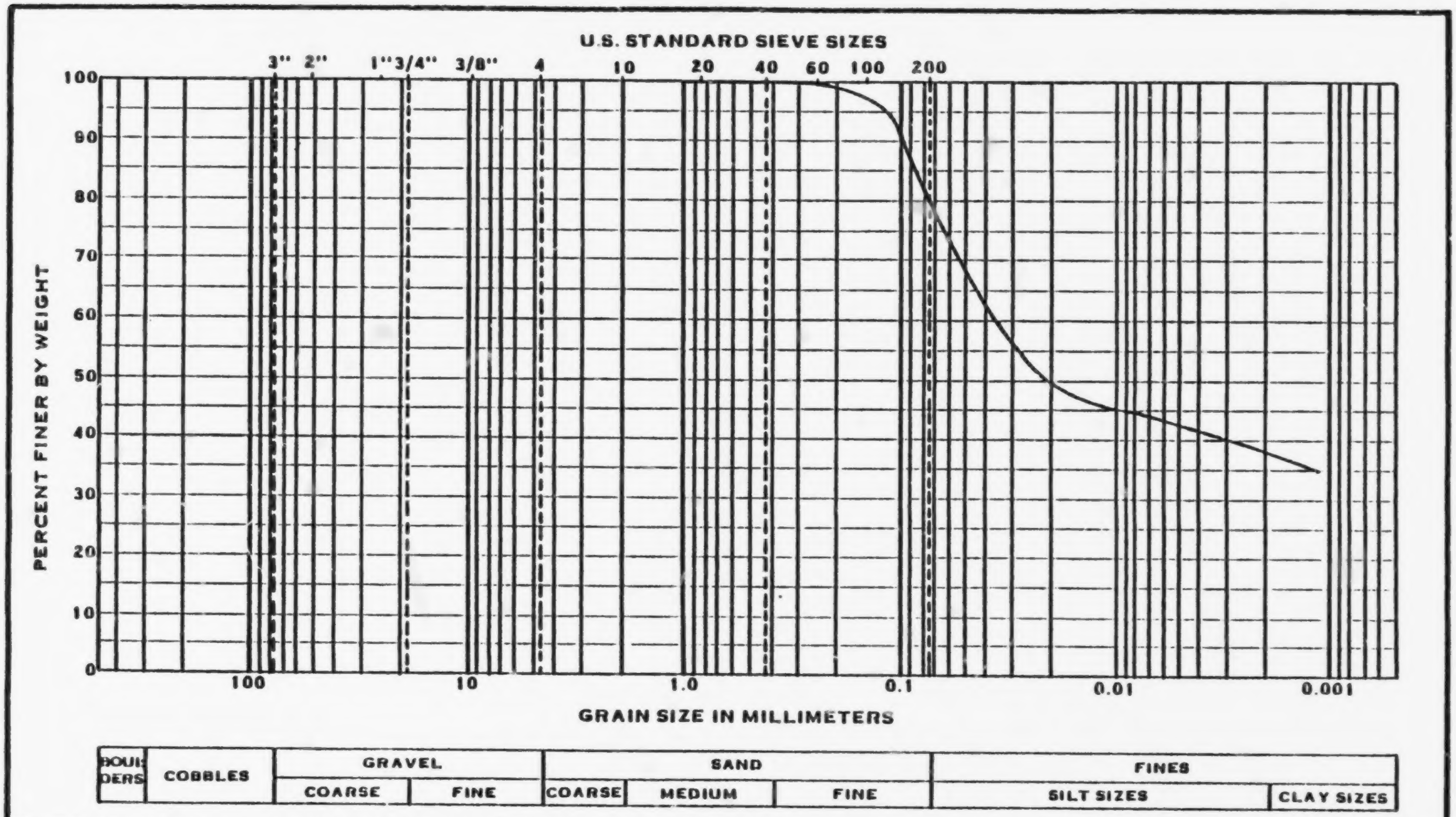
TABLE NO. B - 4.58

252



BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-220	119' - 120.5'				

PREPARED ________ DATE ____
REVISED ________ DATE ____
REVISED ________ DATE ____
APPROVED ________ DATE ____

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TABLE NO. B - 4.59

257

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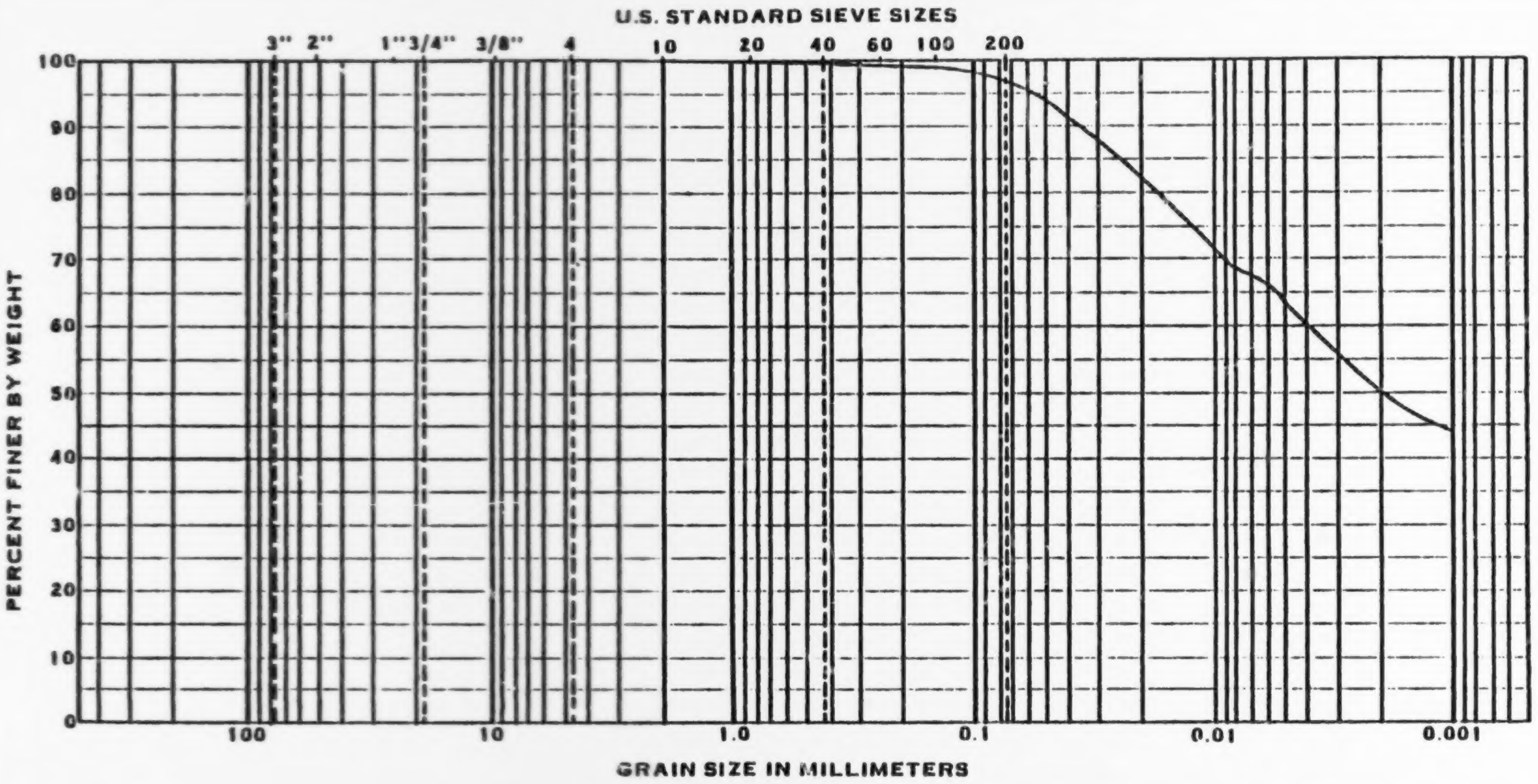

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-222	29' - 30.5'				

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

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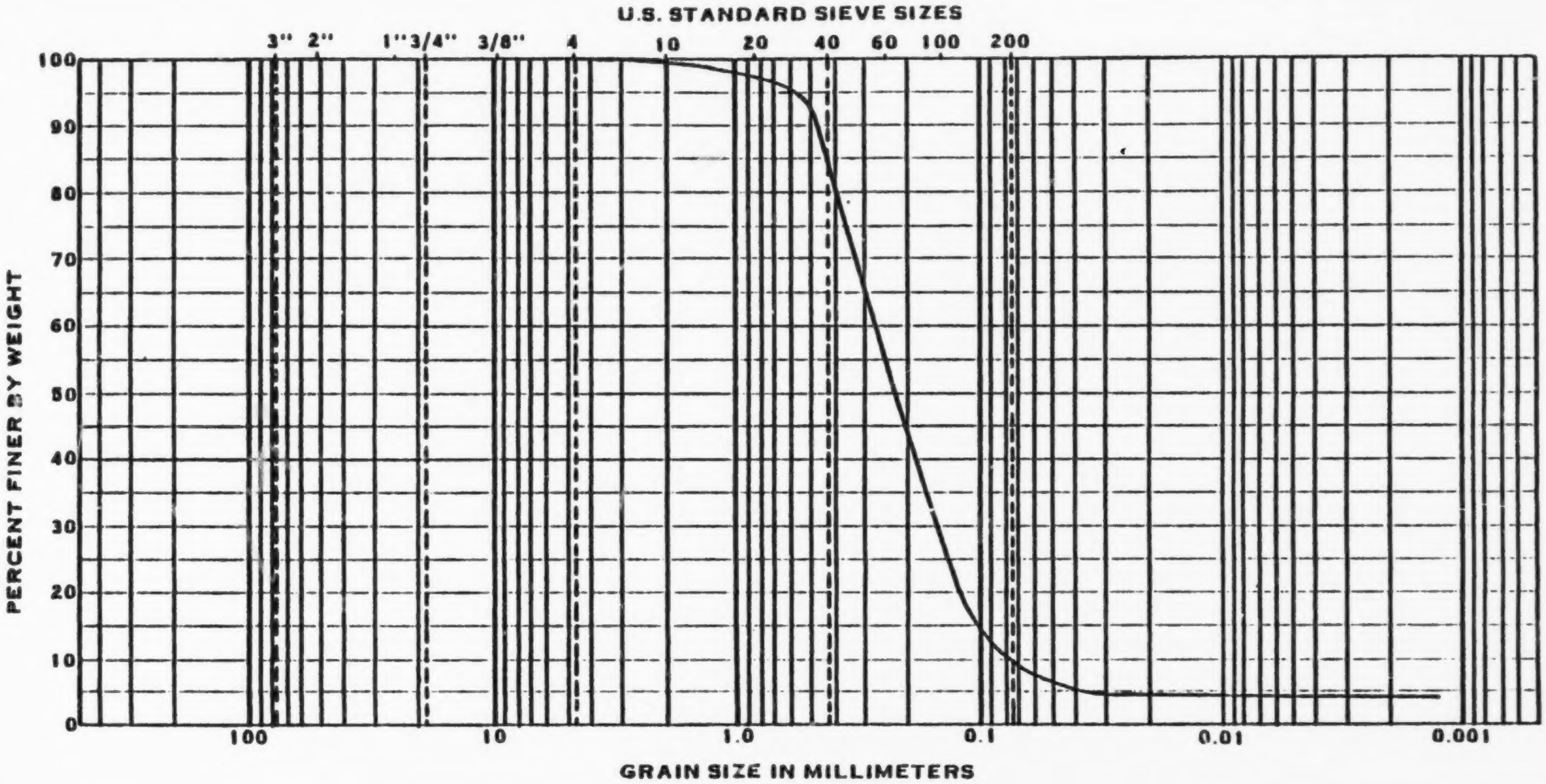
TABLE NO. B - 4.60



BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-223	13.5' - 15'				

PREPARED_______ DATE_____
REVISED_______ DATE_____
REVISED_______ DATE_____
APPROVED_______ DATE_____

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TABLE NO. B - 4.61

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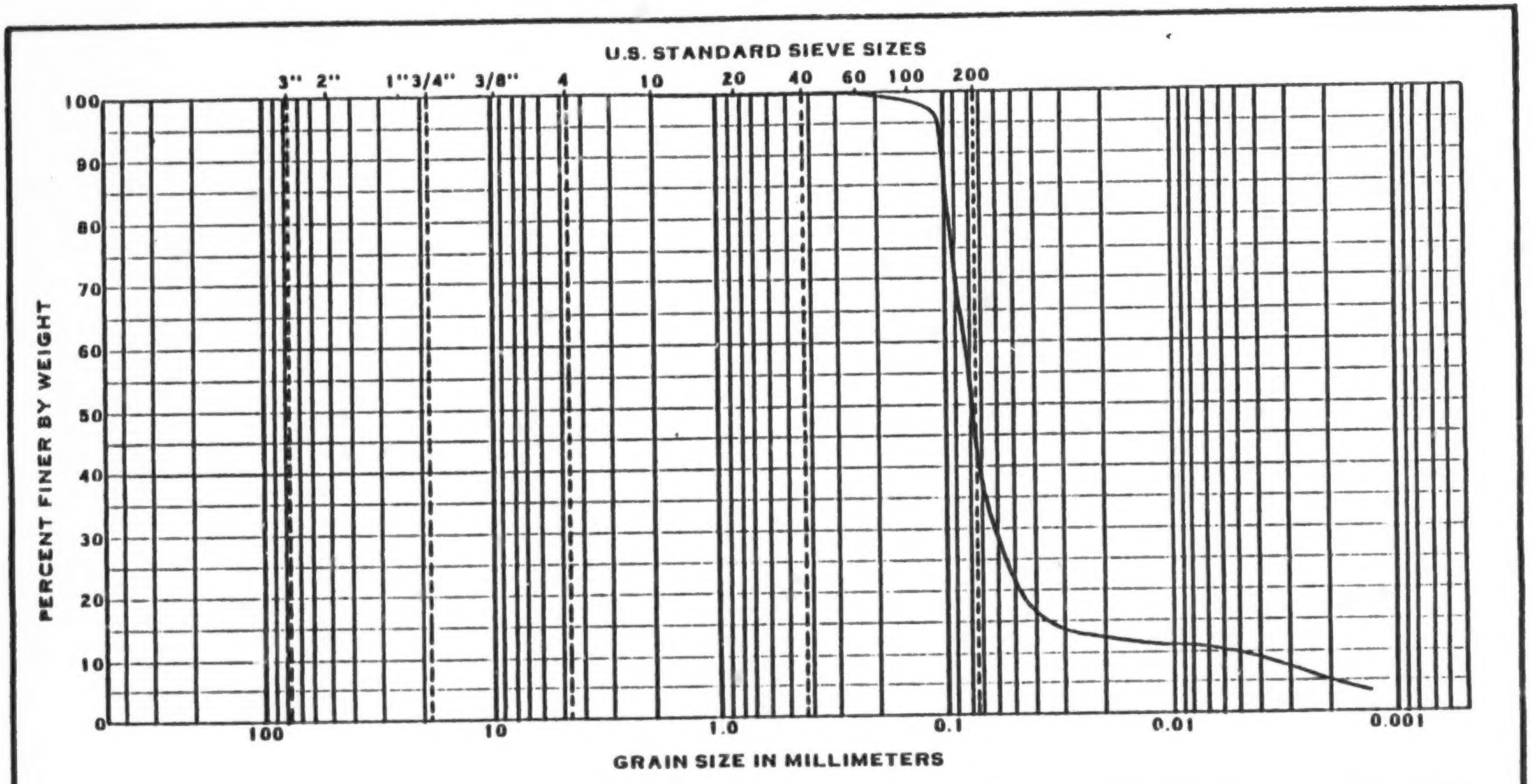

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-227	80' - 81.5'				

PREPARED ________ DATE ____
REVISED ________ DATE ____
REVISED ________ DATE ____
APPROVED ________ DATE ____

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TABLE NO. B - 4.62

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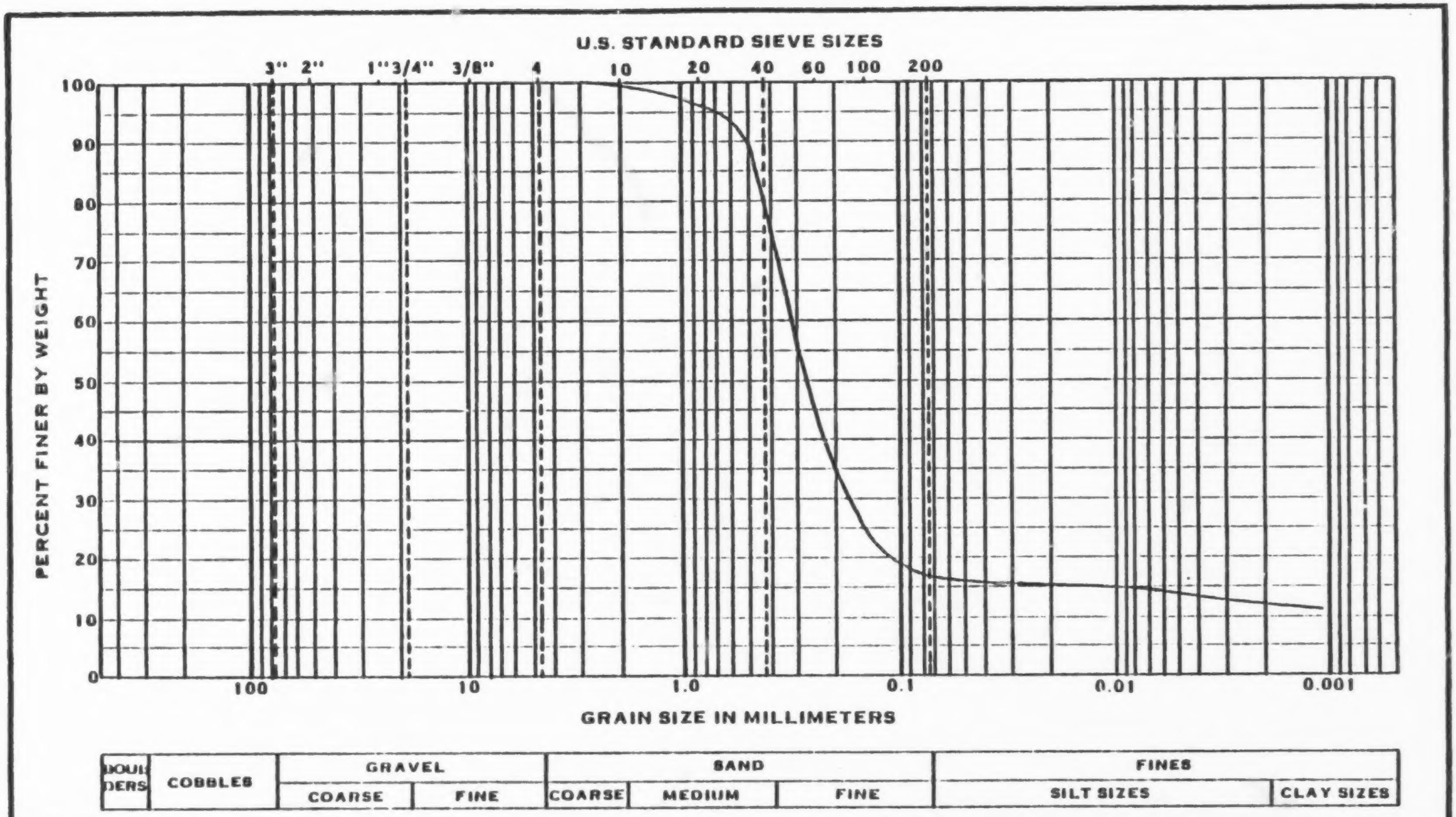

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-229	9' - 10.5'				

PREPARED ______ DATE ____
REVISED ______ DATE ____
REVISED ______ DATE ____
APPROVED ______ DATE ____

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TABLE NO. B - 4.63

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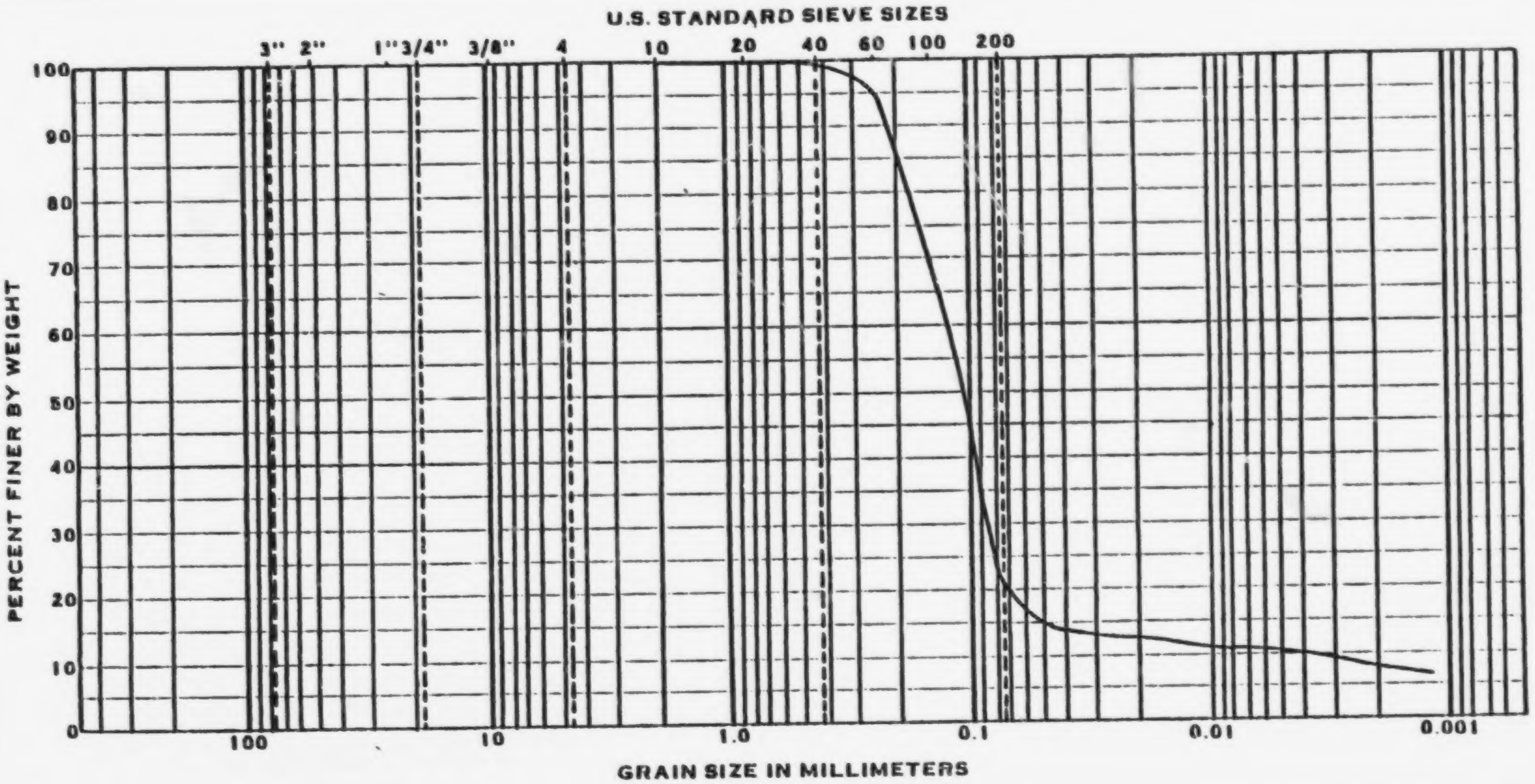

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-229	59' - 60.5'				

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
APPROVED ________ DATE ______

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TABLE NO. B - 4.64

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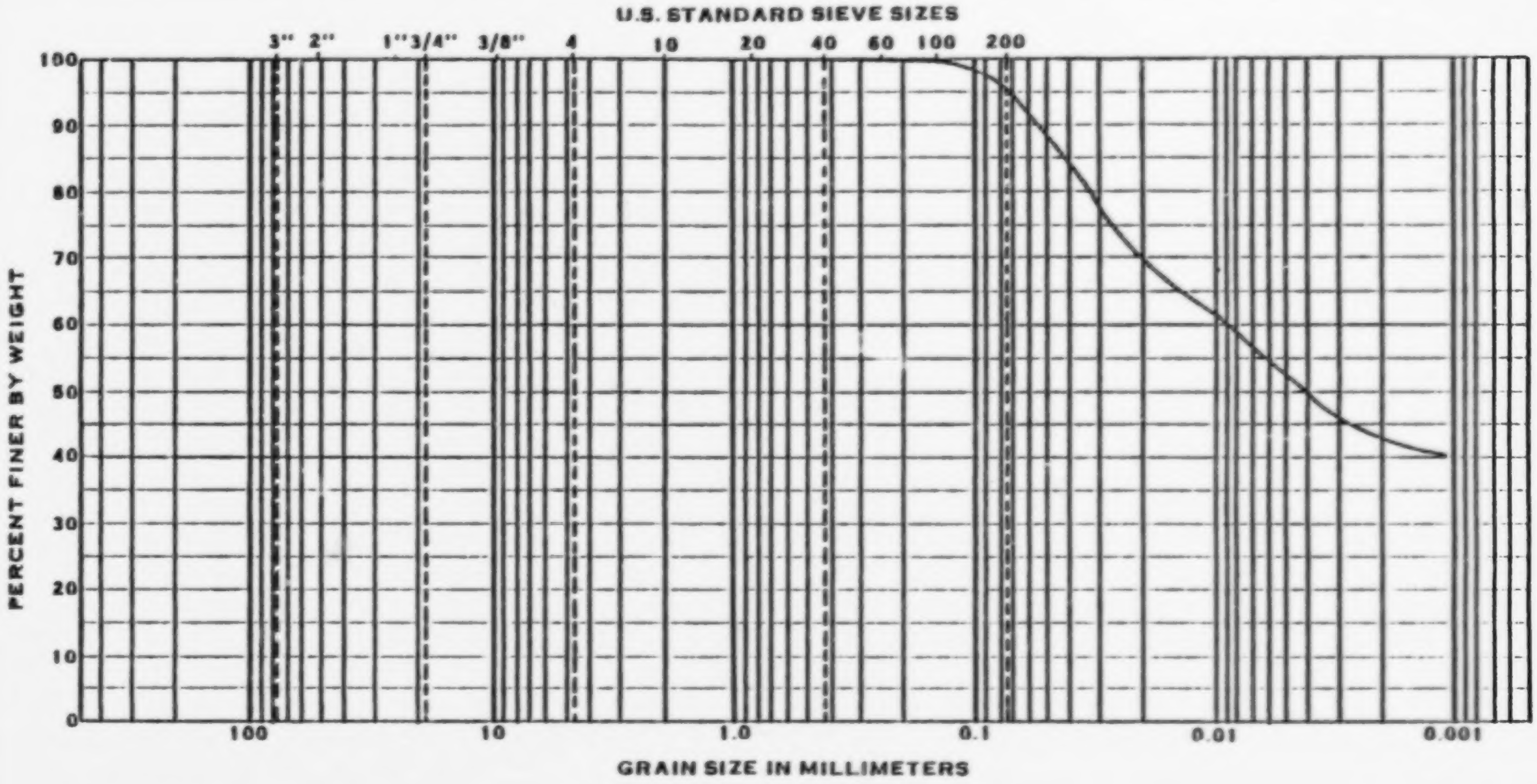

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-229	79' - 80.5'				

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

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TABLE NO. B - 4.65

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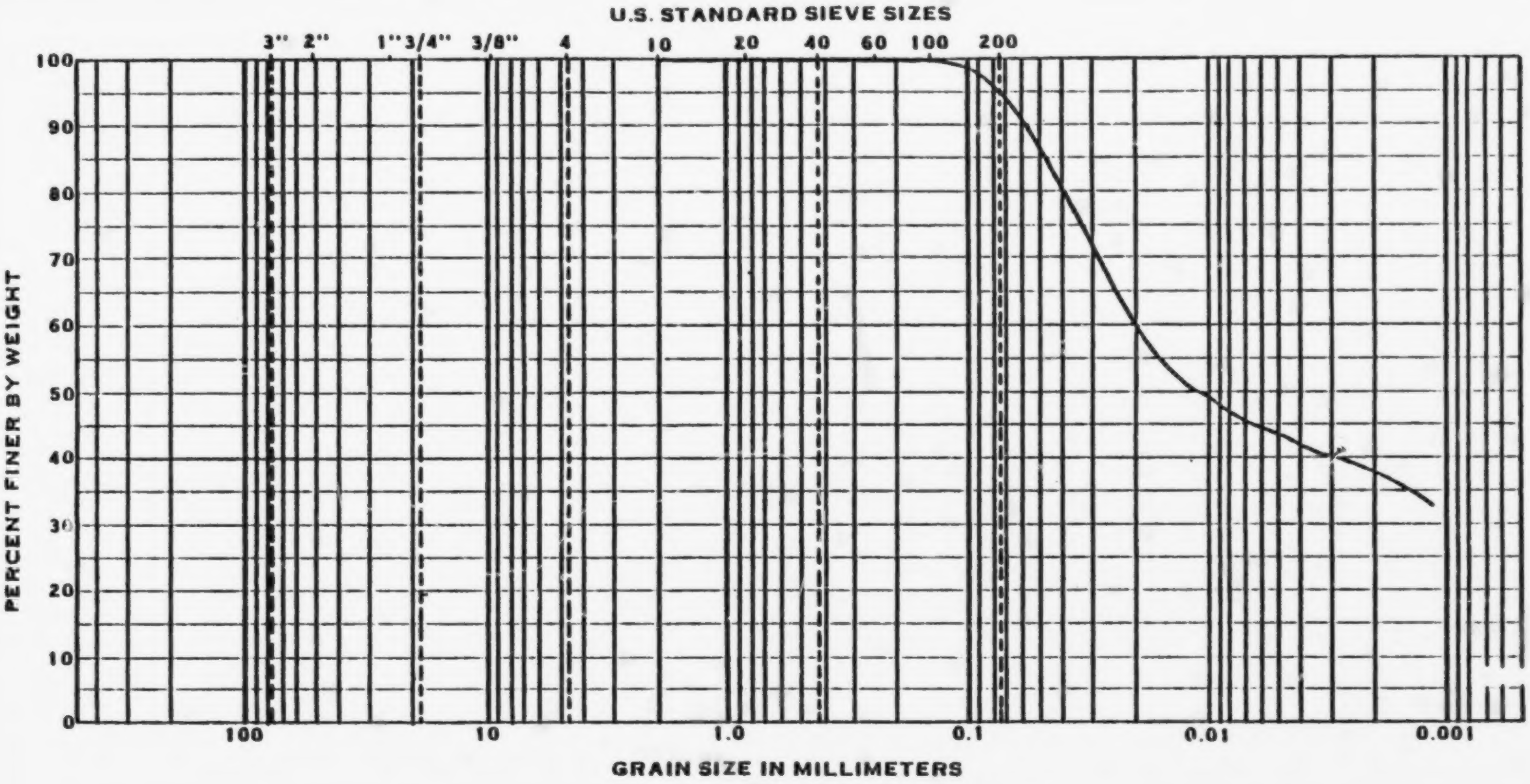

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-230	29' - 30.5'				

PREPARED ________ DATE ____
REVISED ________ DATE ____
REVISED ________ DATE ____
APPROVED ________ DATE ____

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TABLE NO. B - 4.66

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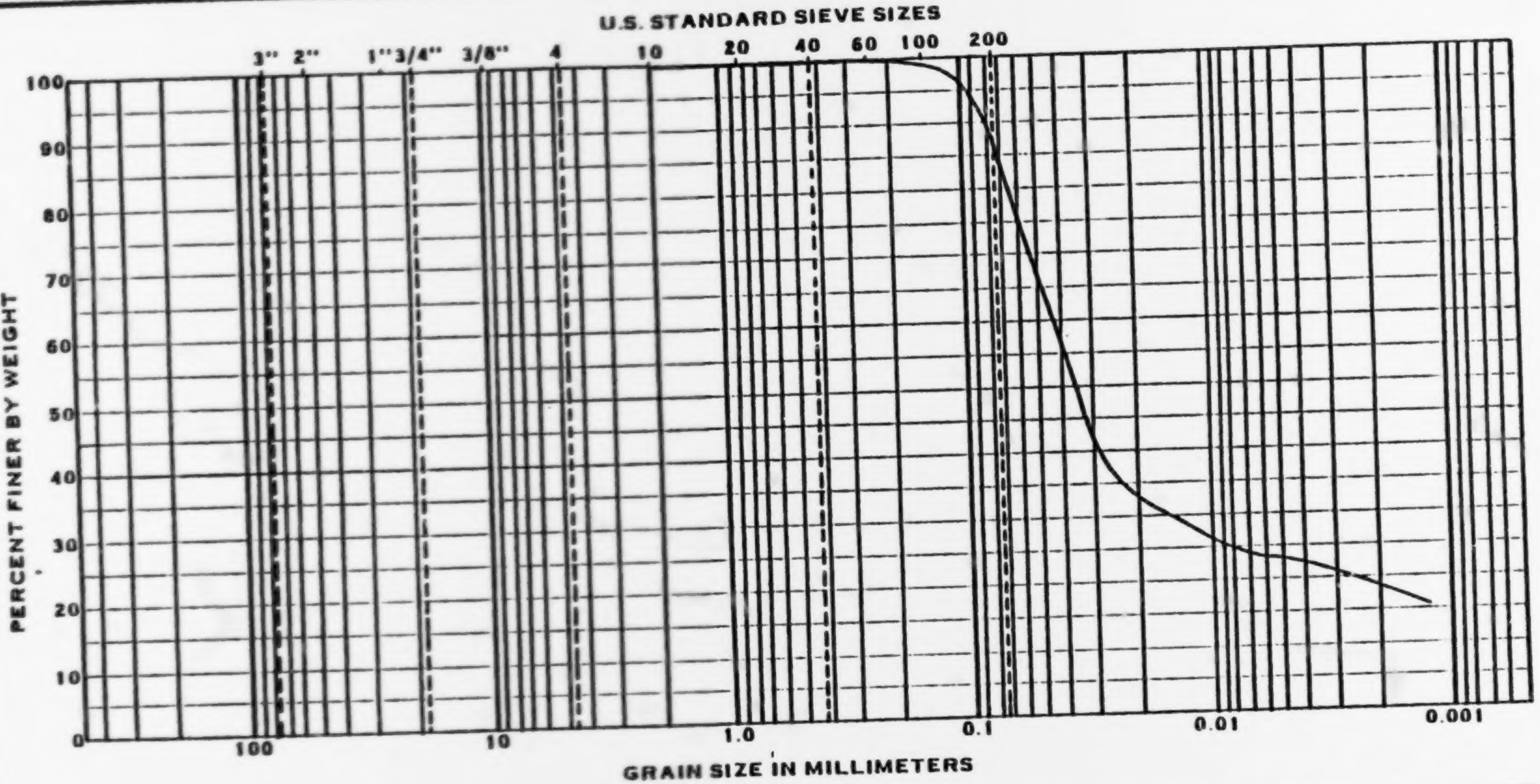


BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-230	99' - 100.5'				

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
APPROVED ________ DATE ______

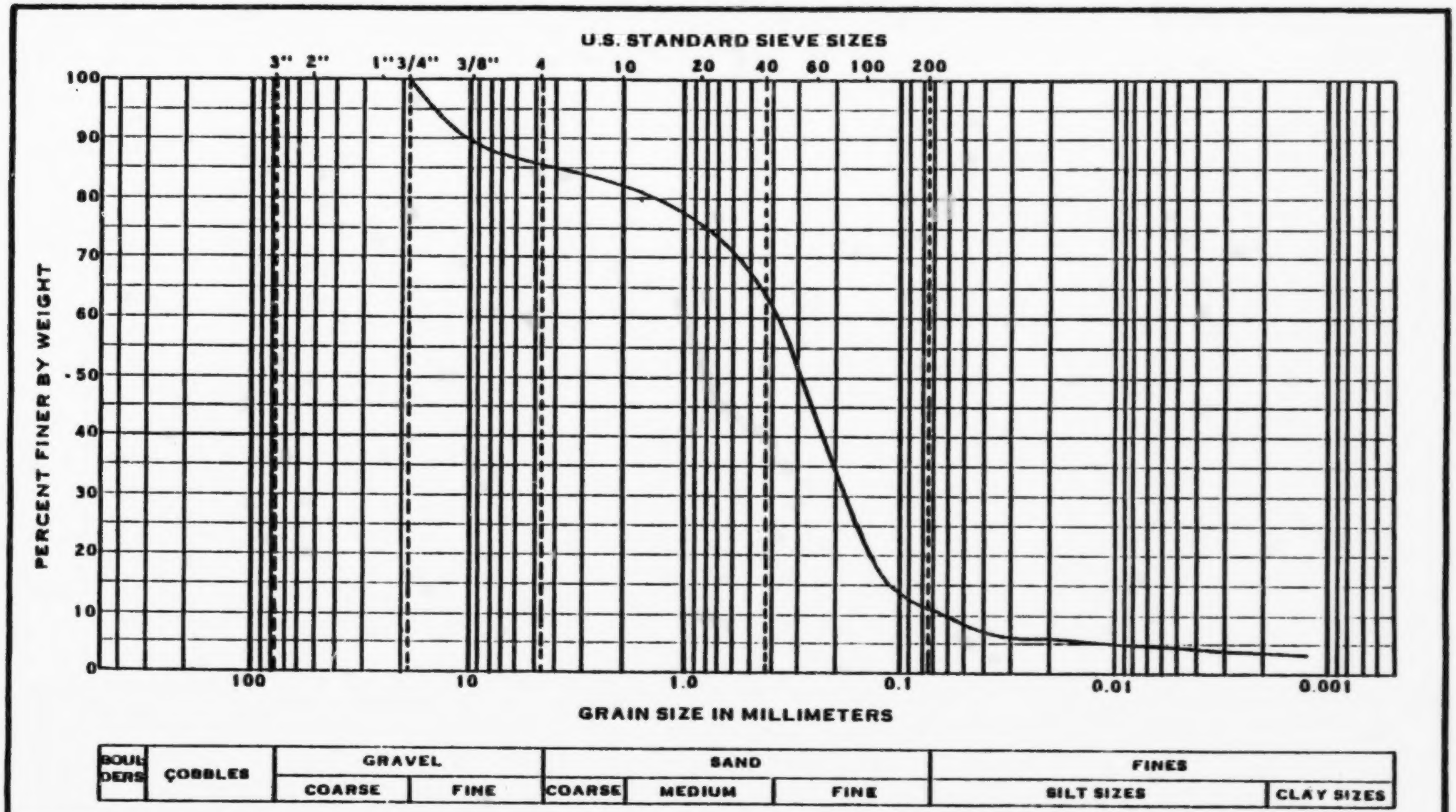
NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX B-4
CYPRESS CREEK DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.67

265 **BEST DOCUMENT AVAILABLE**



BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-230	169' - 170.5'				

PREPARED ______ DATE _____
REVISED ______ DATE _____
REVISED ______ DATE _____
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APPENDIX B-4
CYPRESS CREEK DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.68

266

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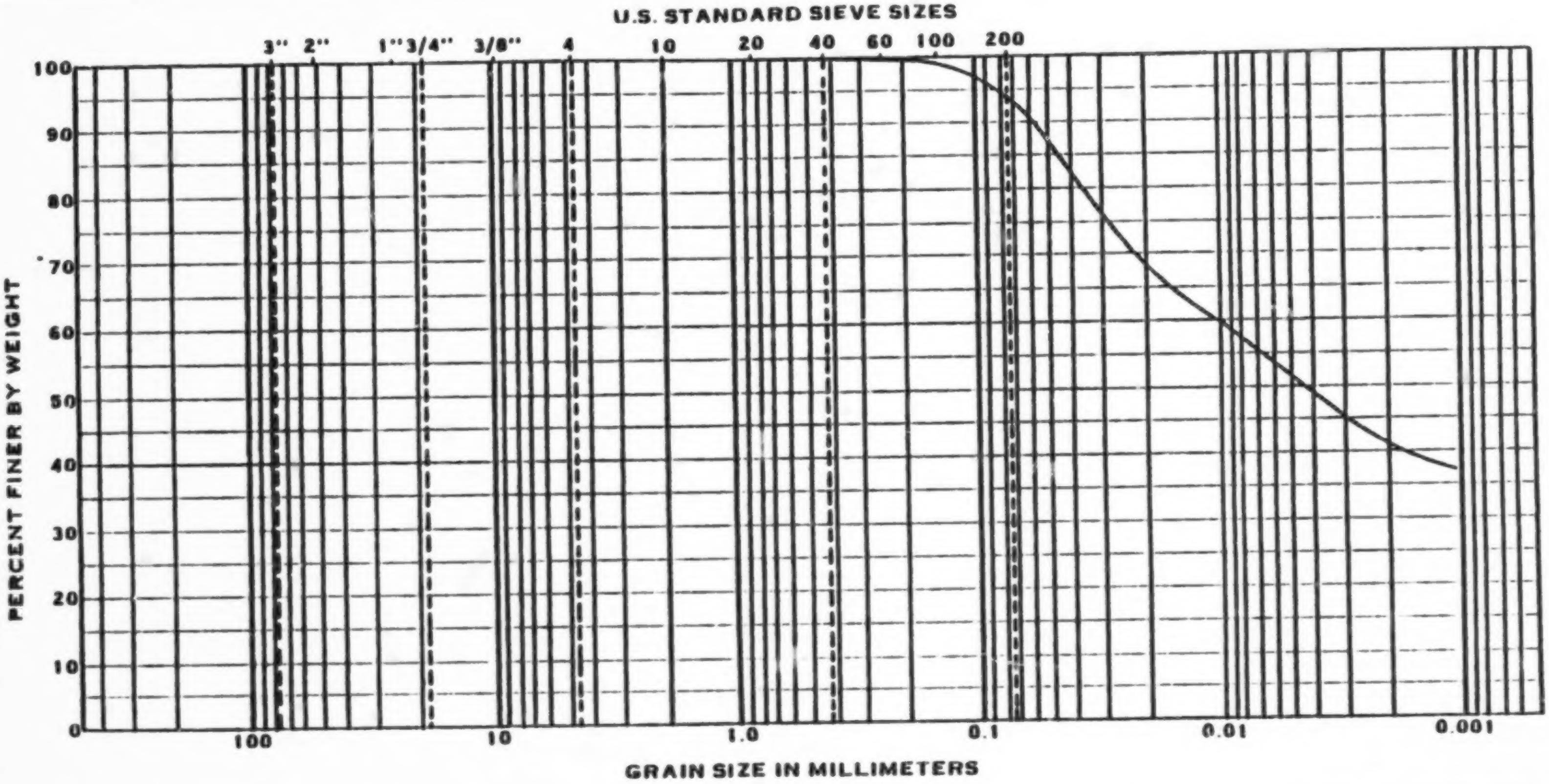

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-230	189' - 190.5'				

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

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CYPRESS CREEK DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.69

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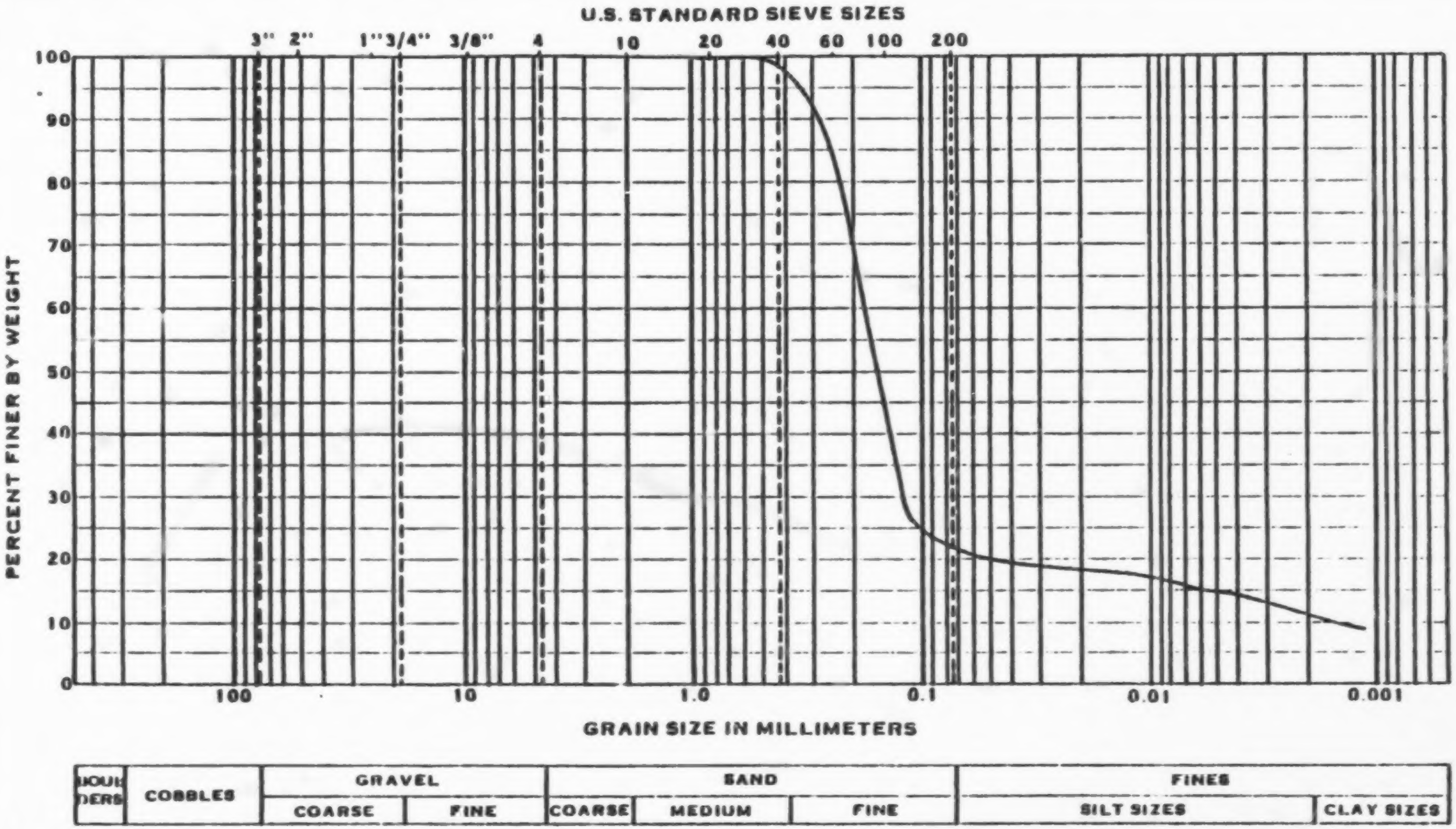

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-232	19' - 20.5'				

PREPARED ________ DATE ________
REVISED ________ DATE ________
REVISED ________ DATE ________
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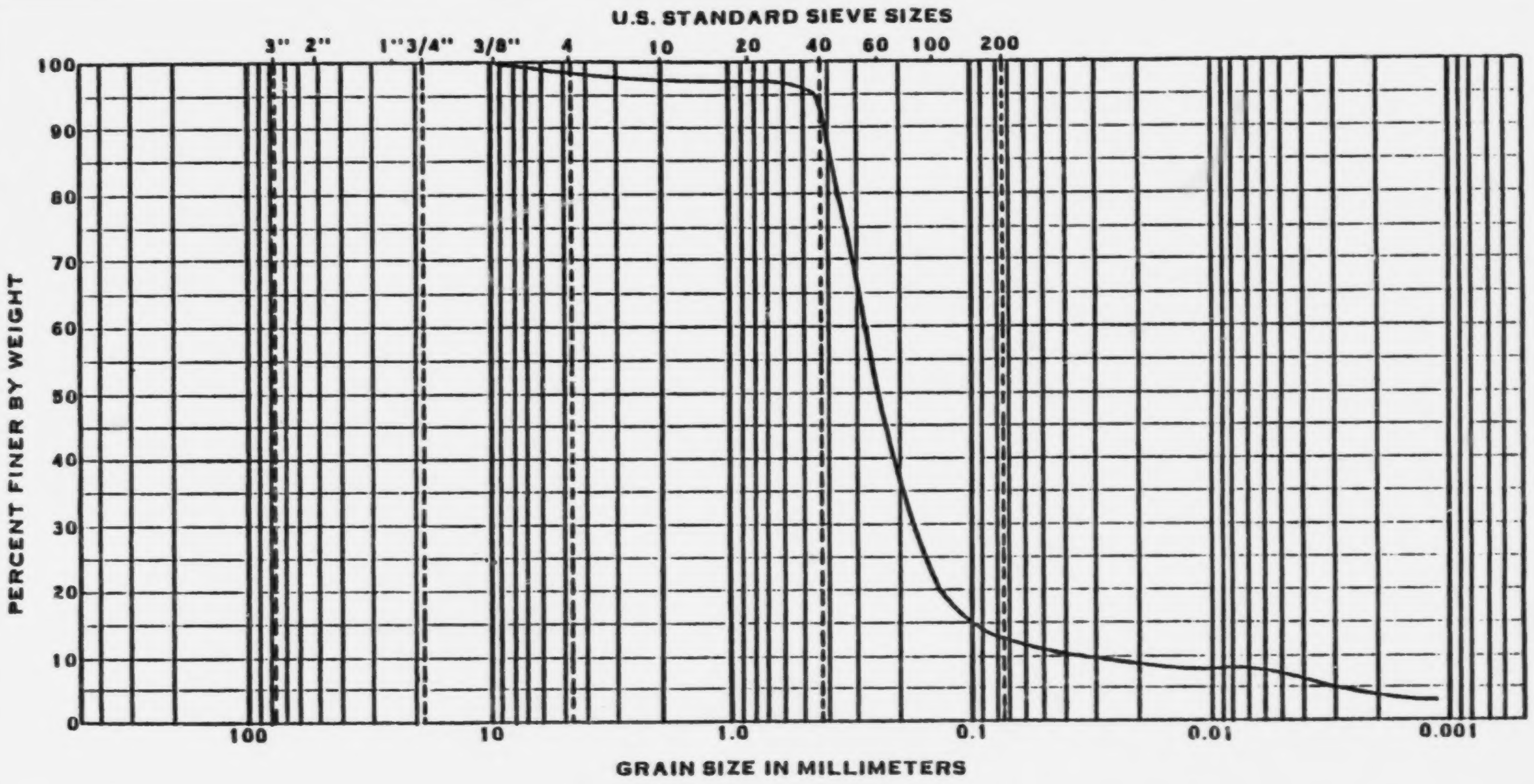
CYPRESS CREEK DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.70



BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-232	89' - 90.5'				

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
APPROVED ________ DATE ______

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GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.71

269

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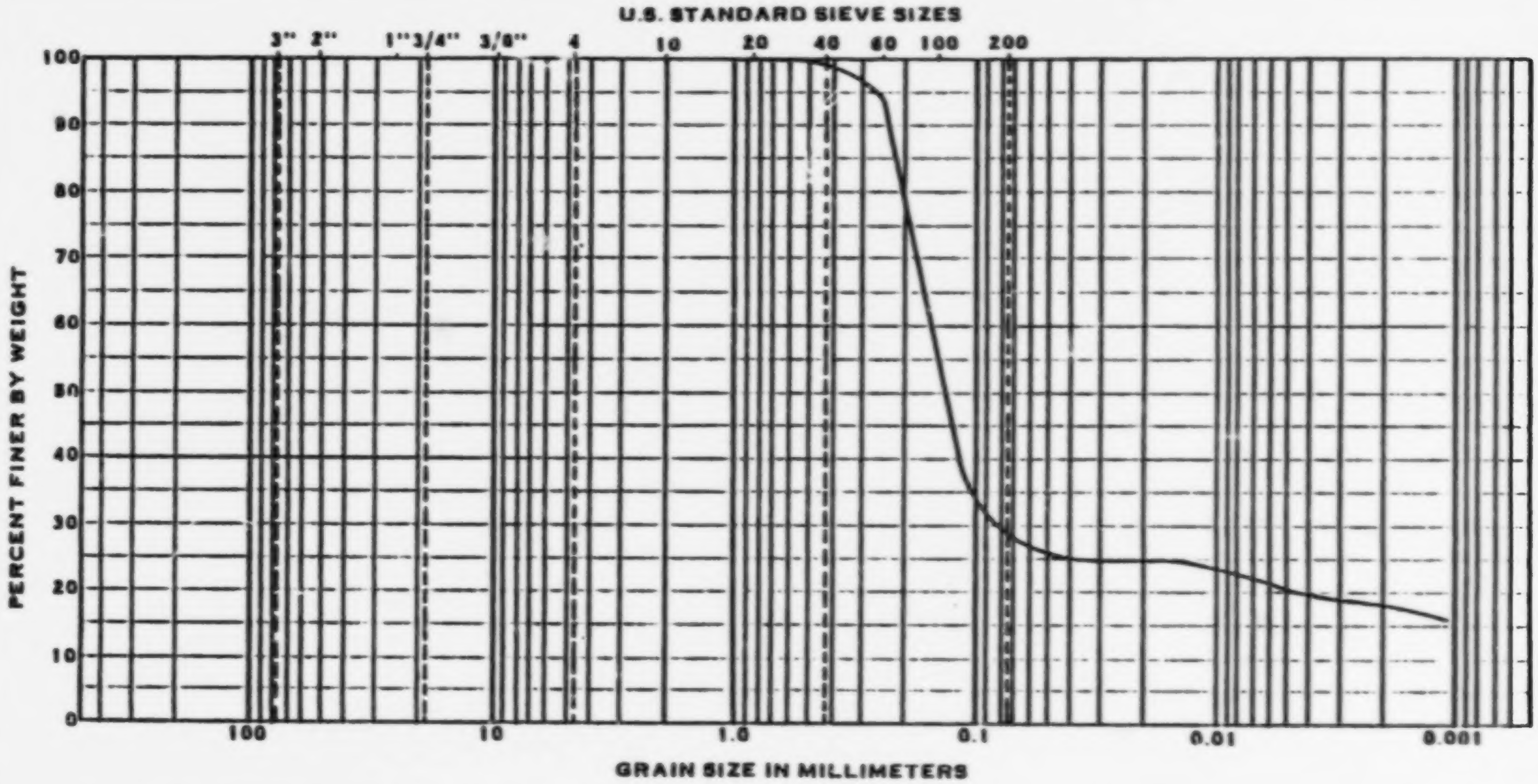

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MCCG-232	119' - 120.5'				

PREPARED______ DATE______
REVISED______ DATE______
REVISED______ DATE______
APPROVED______ DATE______

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GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.72

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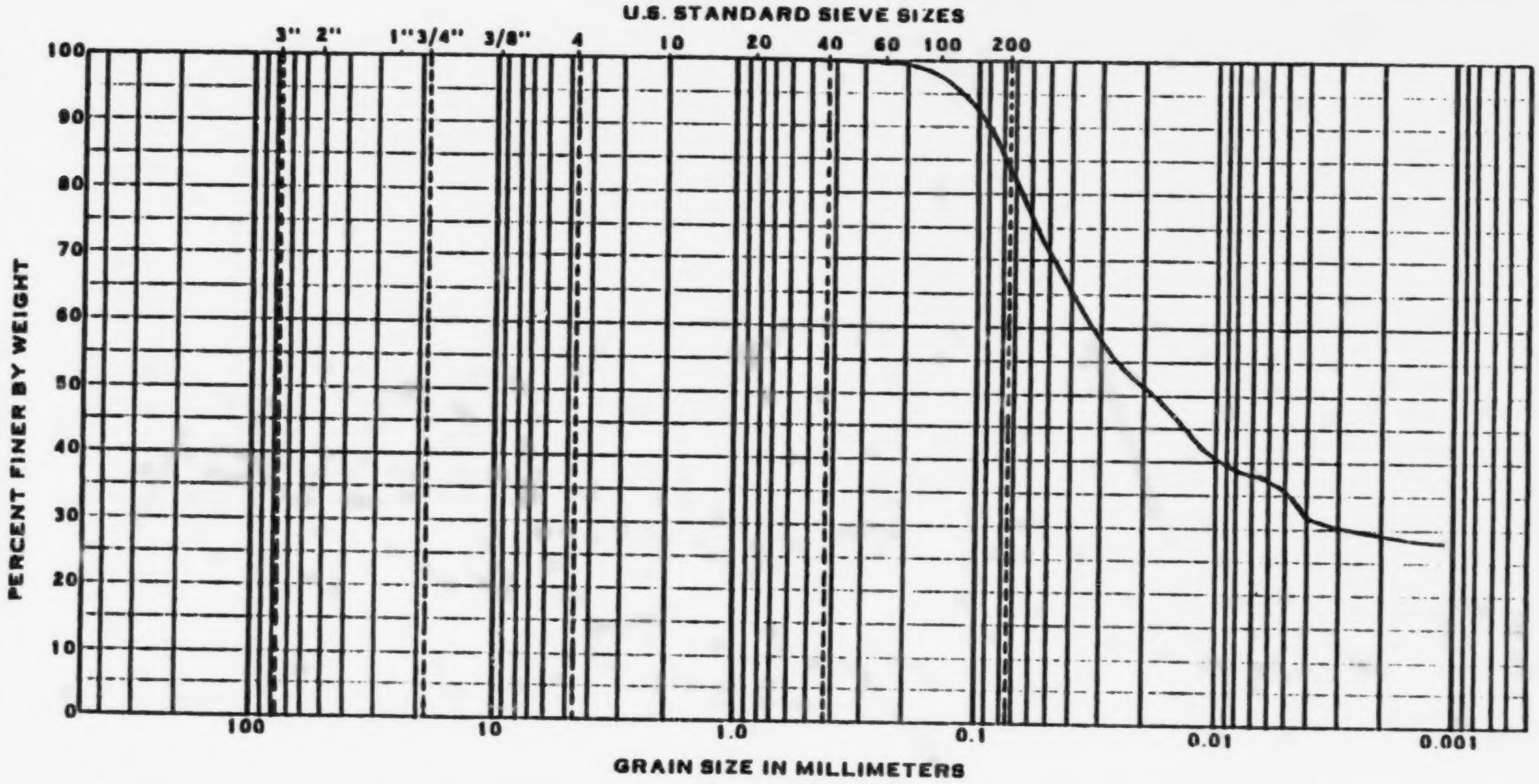

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-201	4' - 5.5				

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

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RICHTON DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.73

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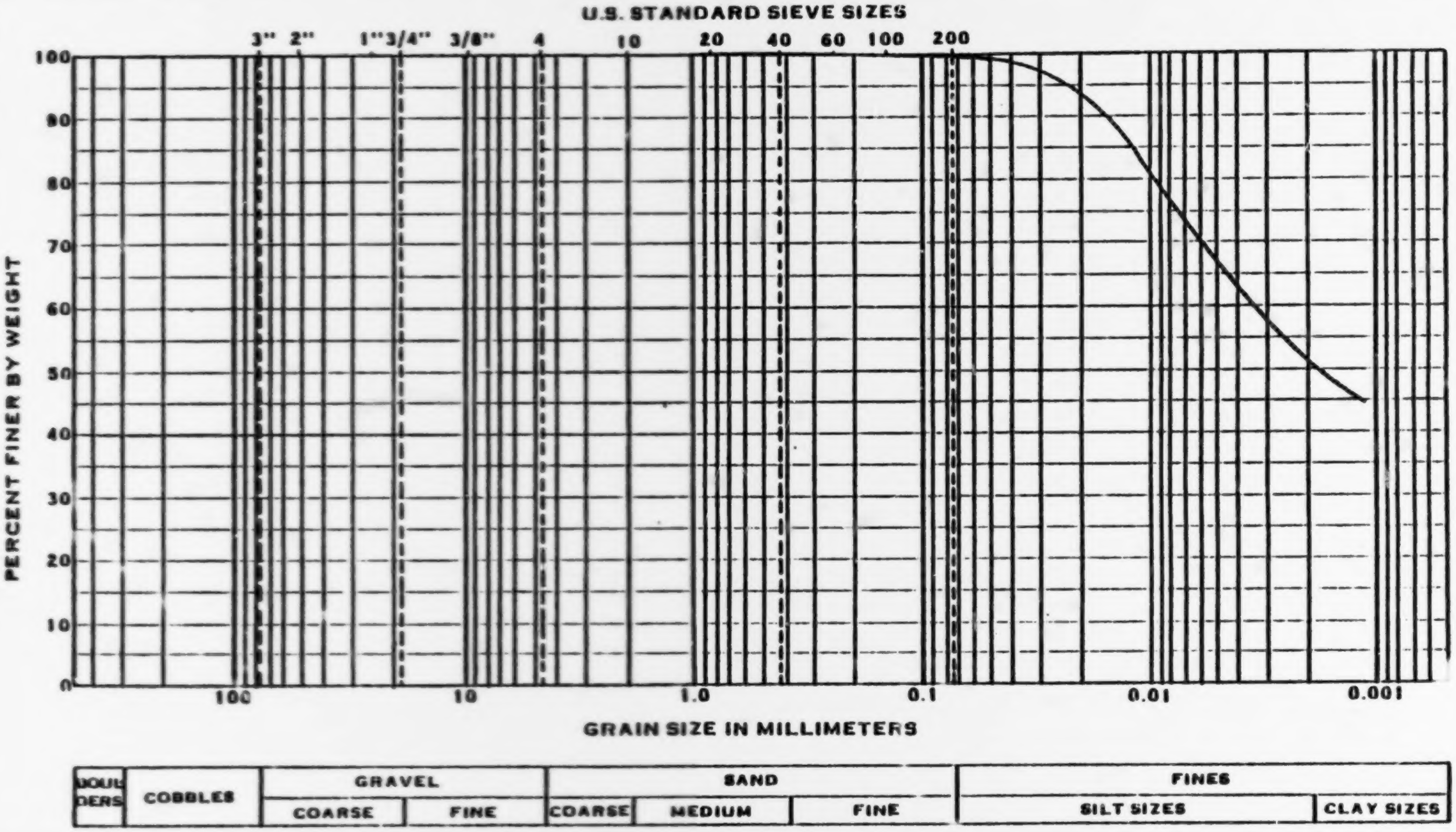

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-201	20'				

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

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GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.74

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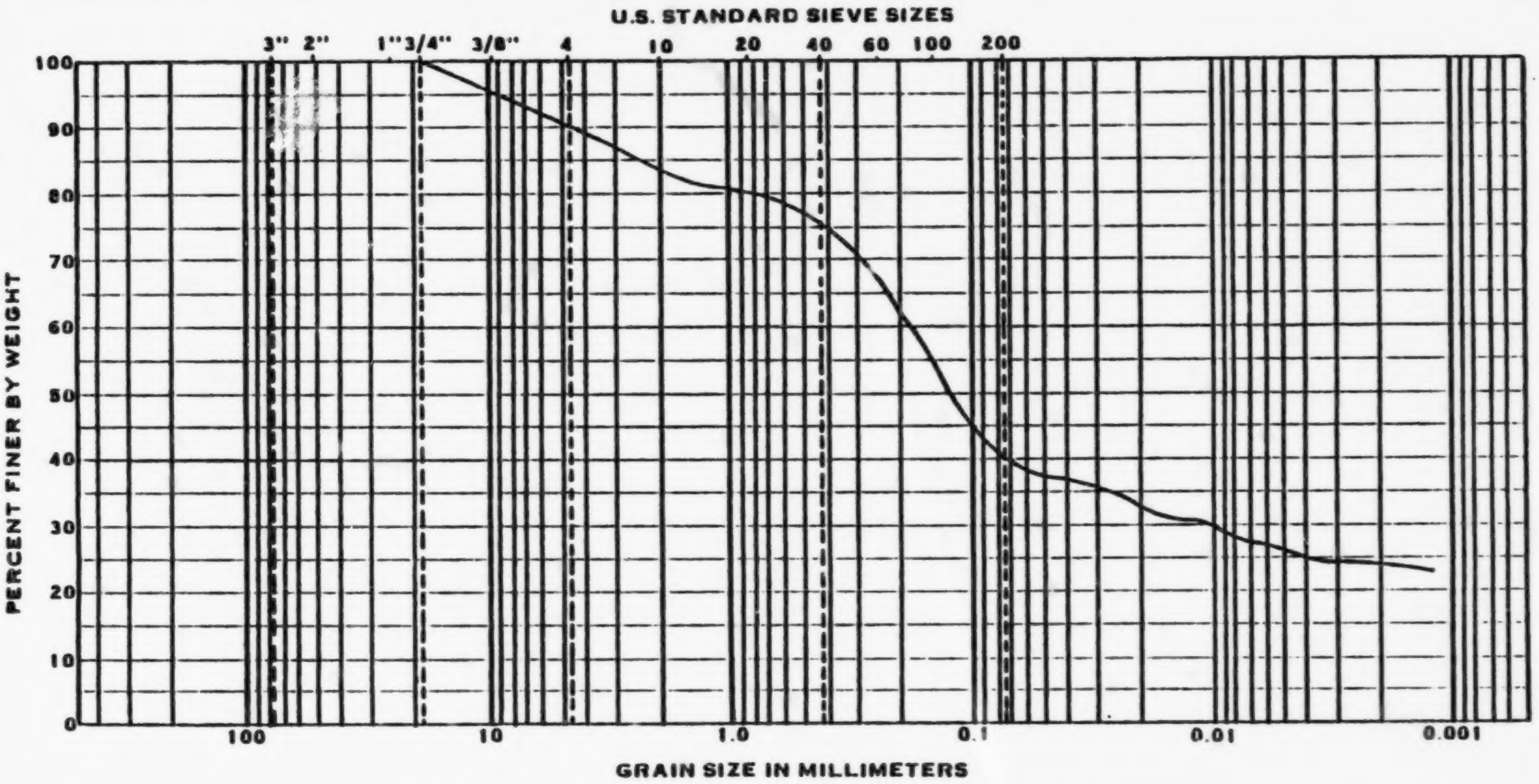

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG -202	4' - 5.5				

PREPARED_______ DATE_____
REVISED_______ DATE_____
REVISED_______ DATE_____
APPROVED_______ DATE_____

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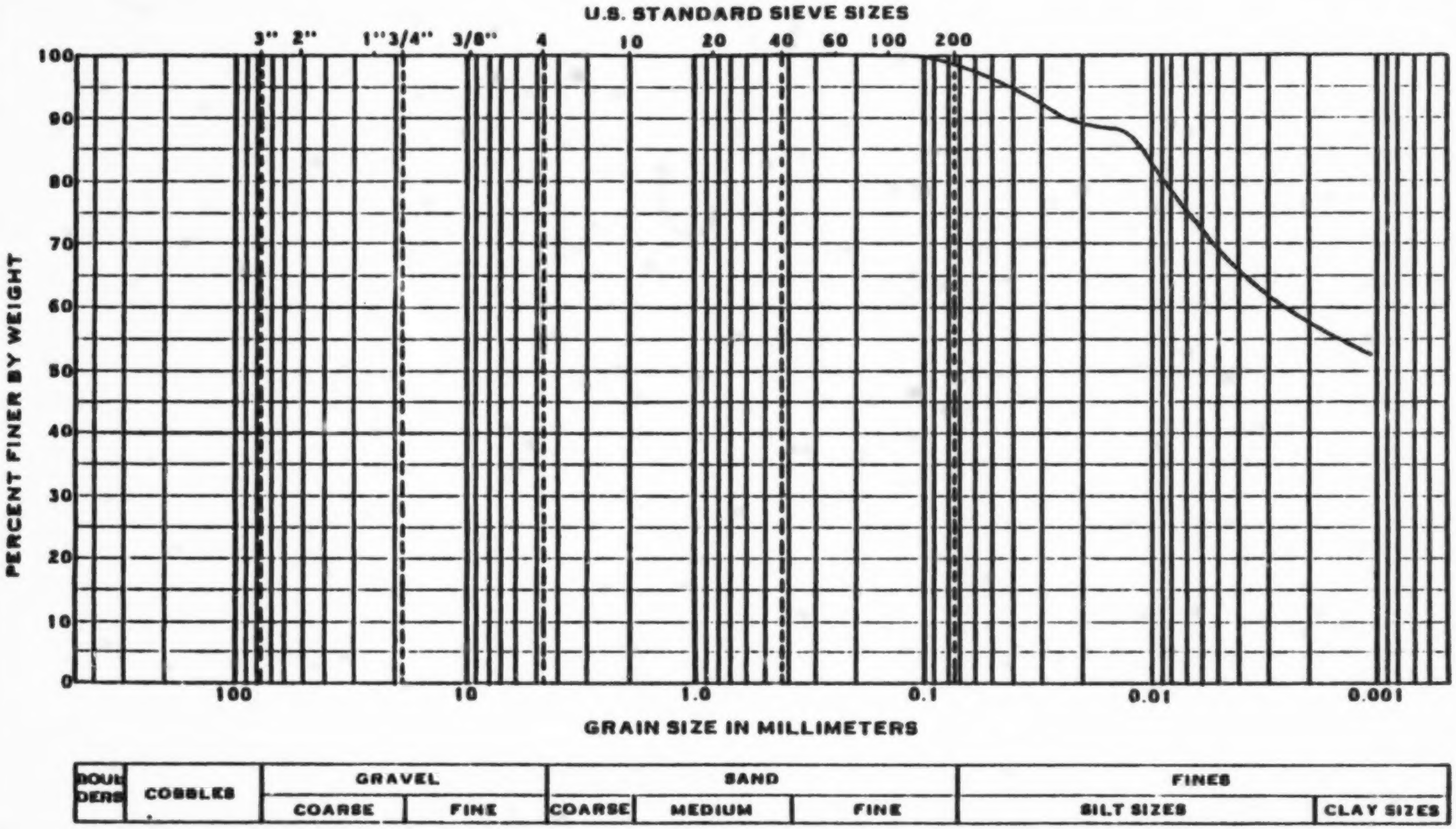
RICHTON DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B -4.75

273 **BEST DOCUMENT AVAILABLE**



BORING NO.	ELEV. OR DEPTH	NAT WC	L.L	PL	PI
MRIG-203	4' - 5.5				

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

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GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.76

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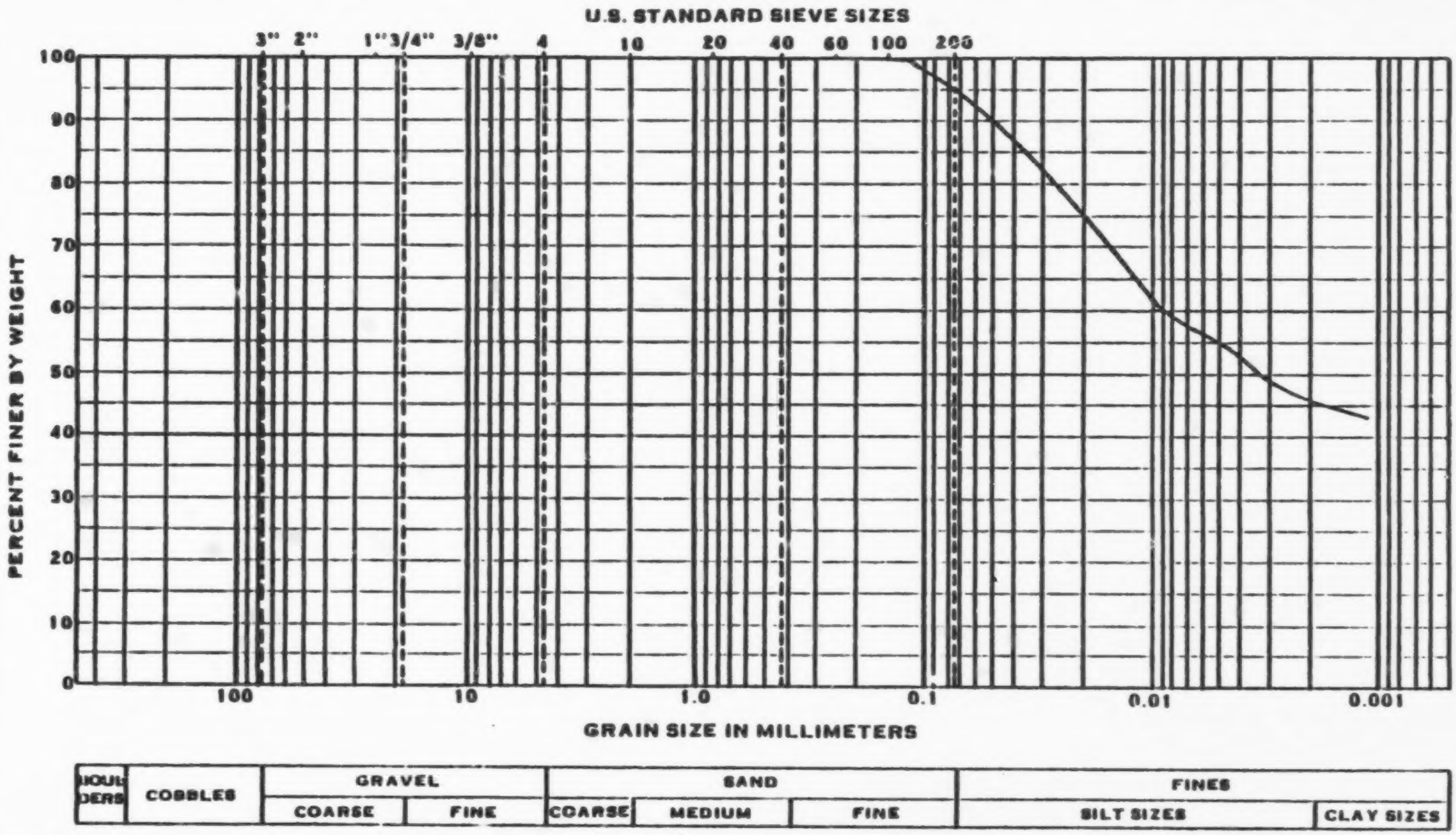

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-203	20'				

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

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TABLE NO. B - 4.77

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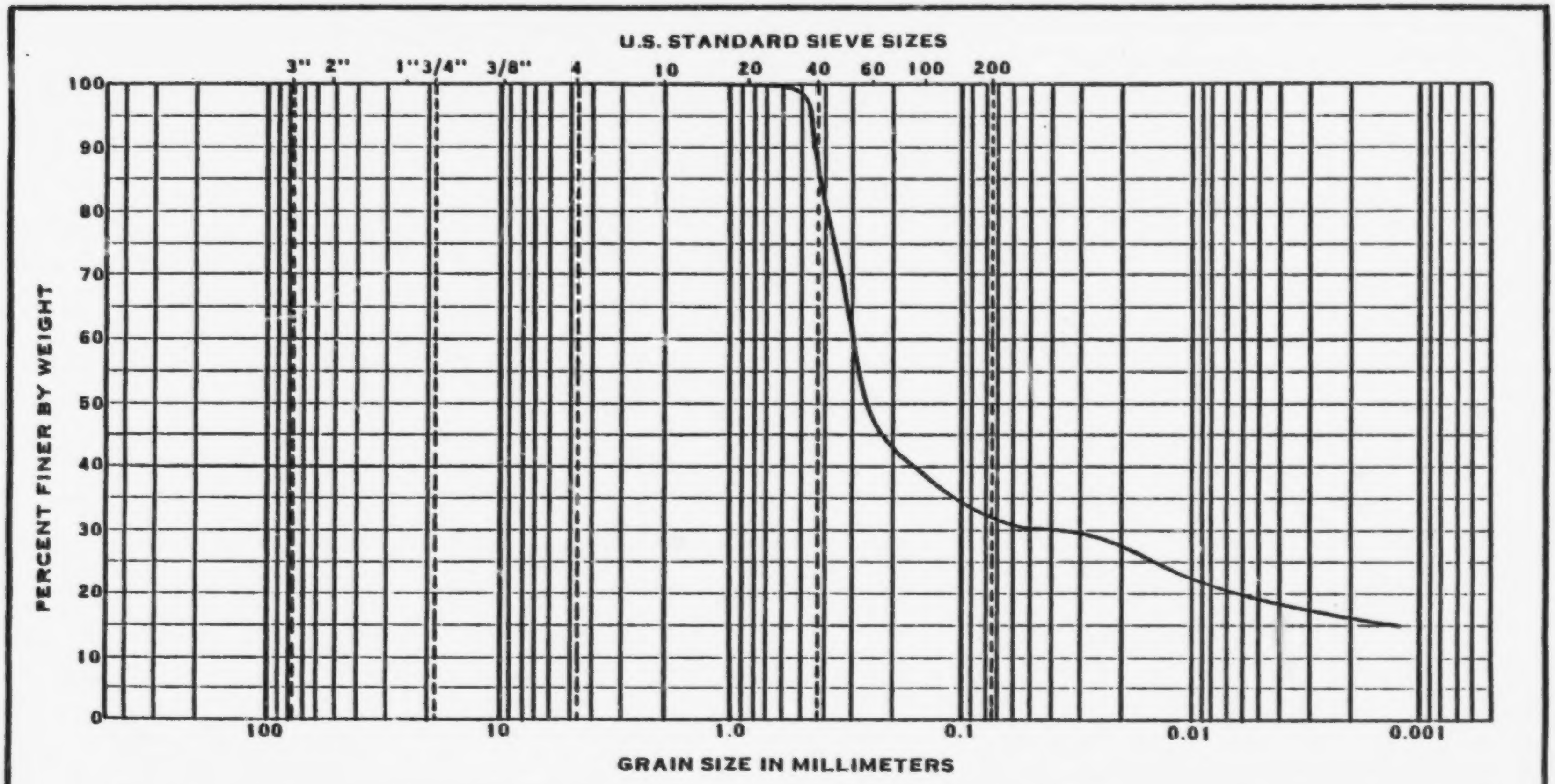

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-204	4' - 5.5				

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
APPROVED ________ DATE ______

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GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.78

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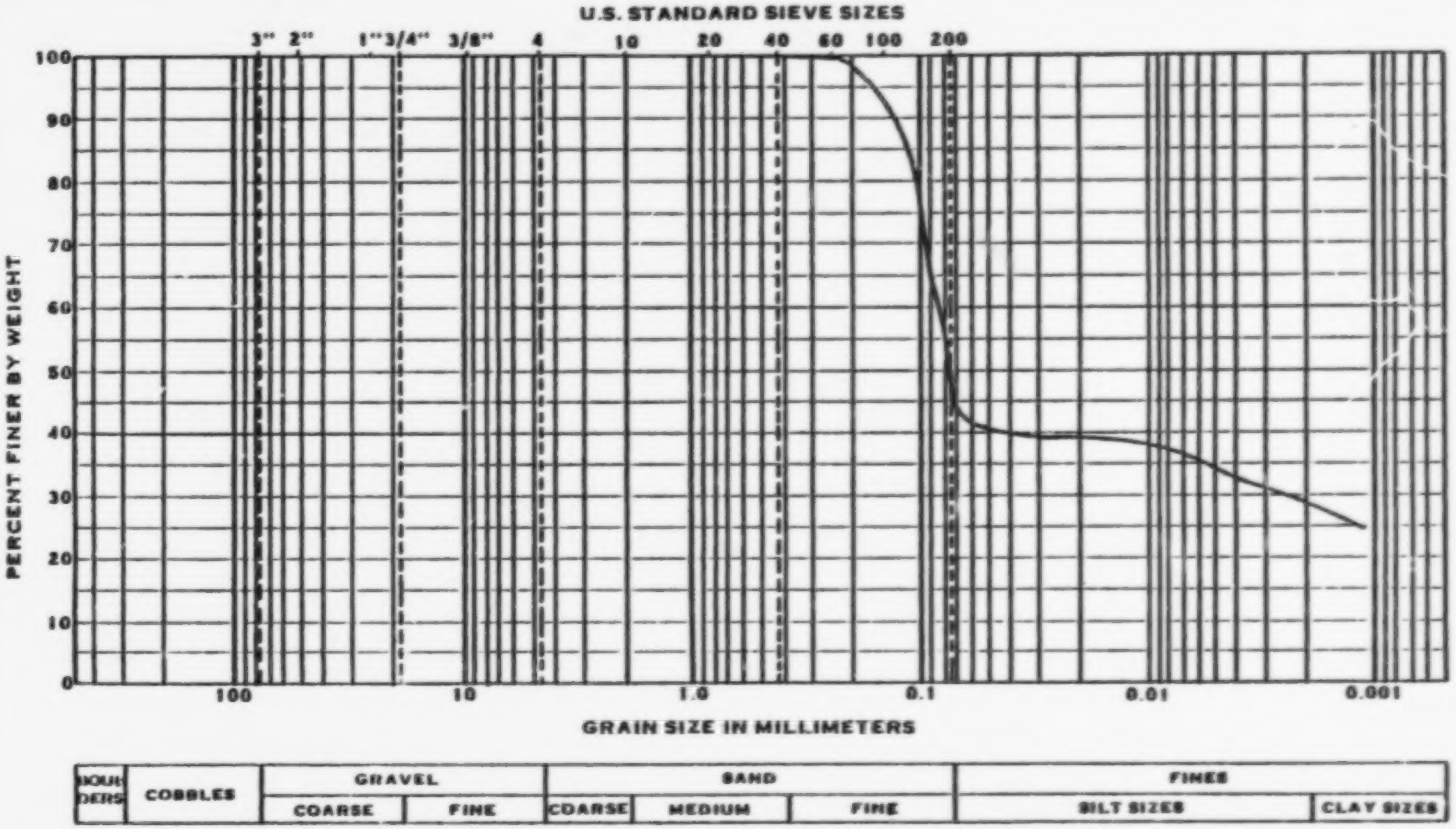

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-204	55'				

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
APPROVED ________ DATE ______

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GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.79

277

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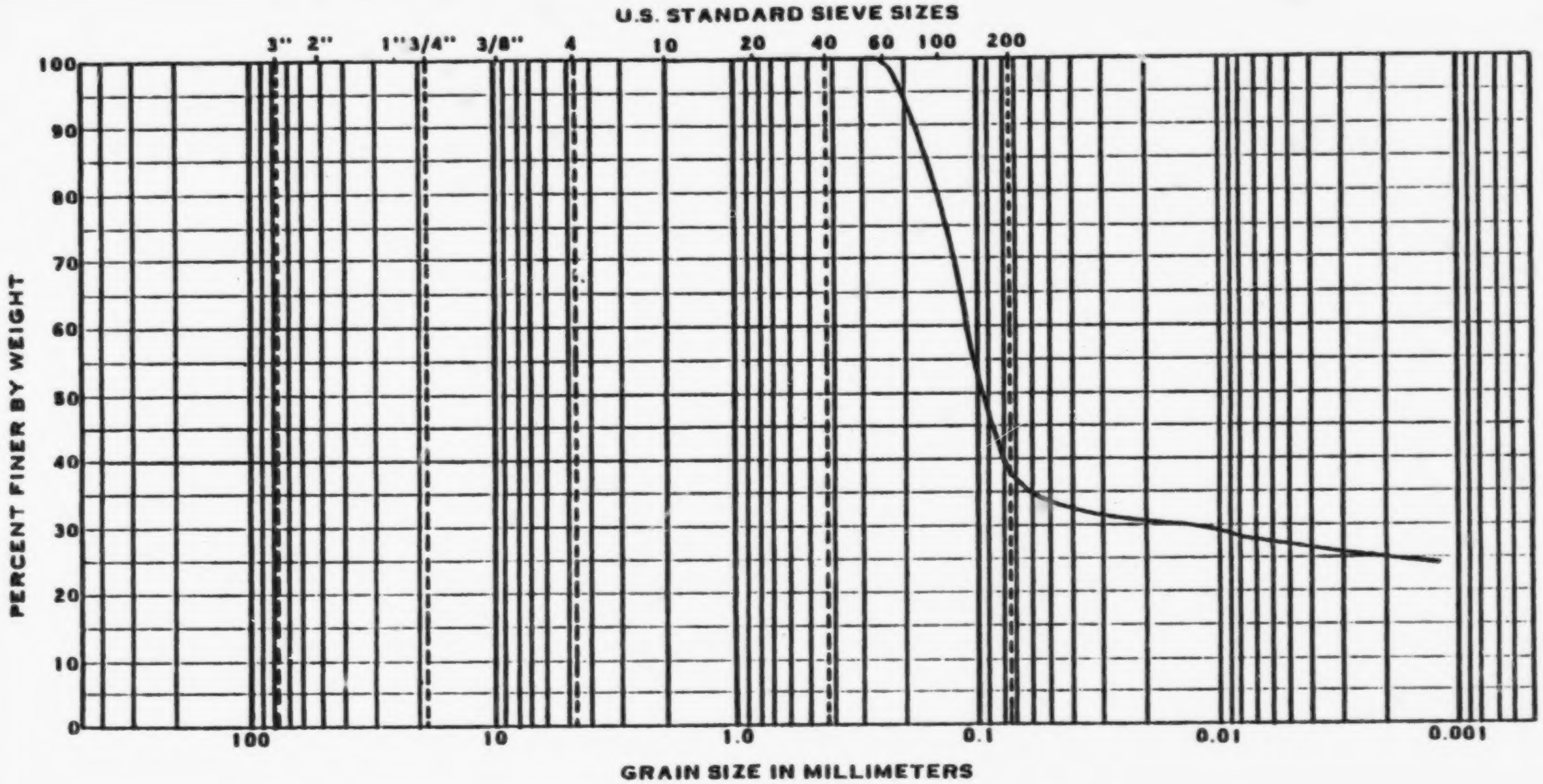

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-205	4' - 5.5				

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

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GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.80

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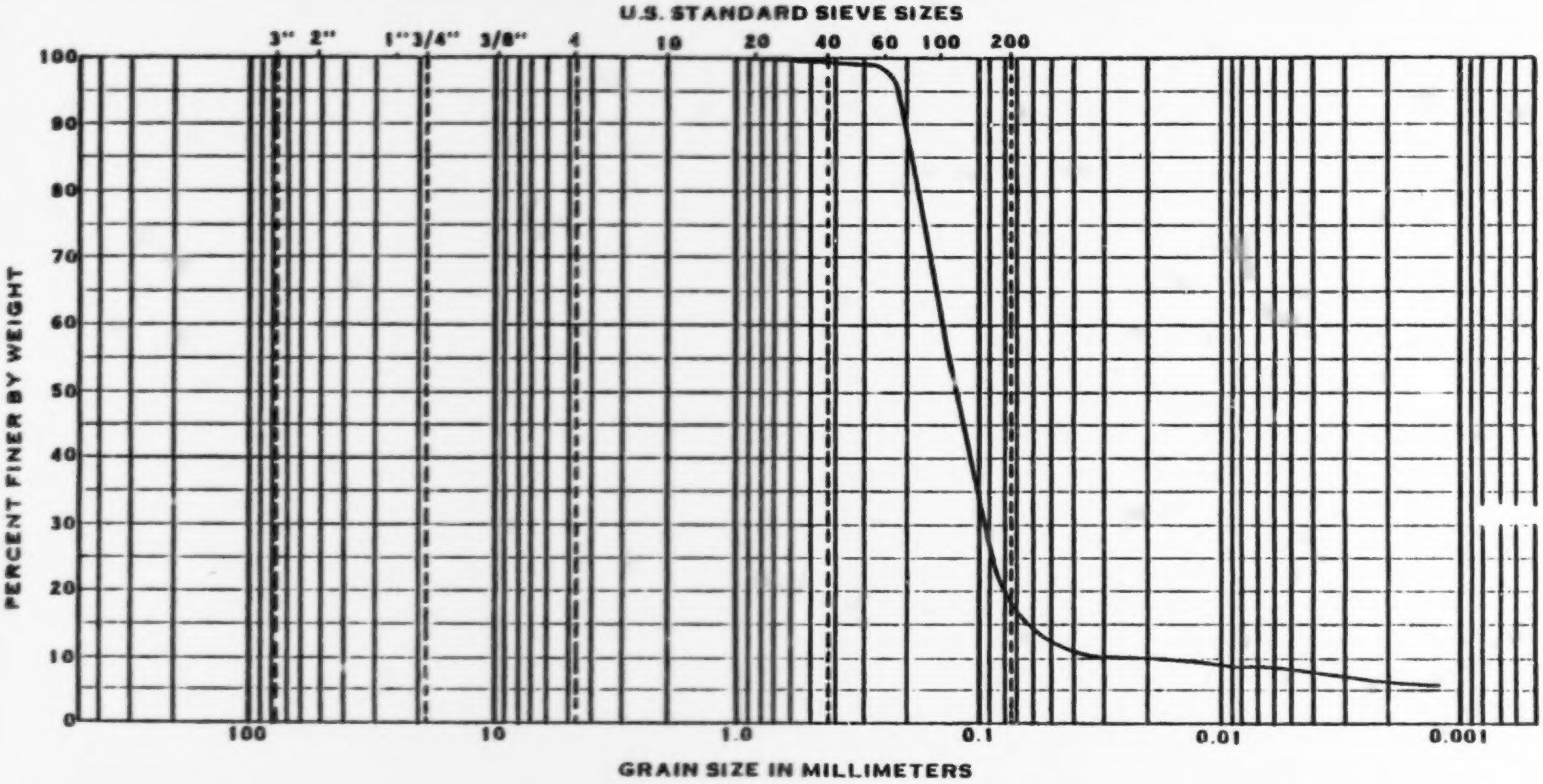

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-205	20'				

PREPARED ______ DATE ____
REVISED ______ DATE ____
REVISED ______ DATE ____
APPROVED ______ DATE ____

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TABLE NO. B - 4.81

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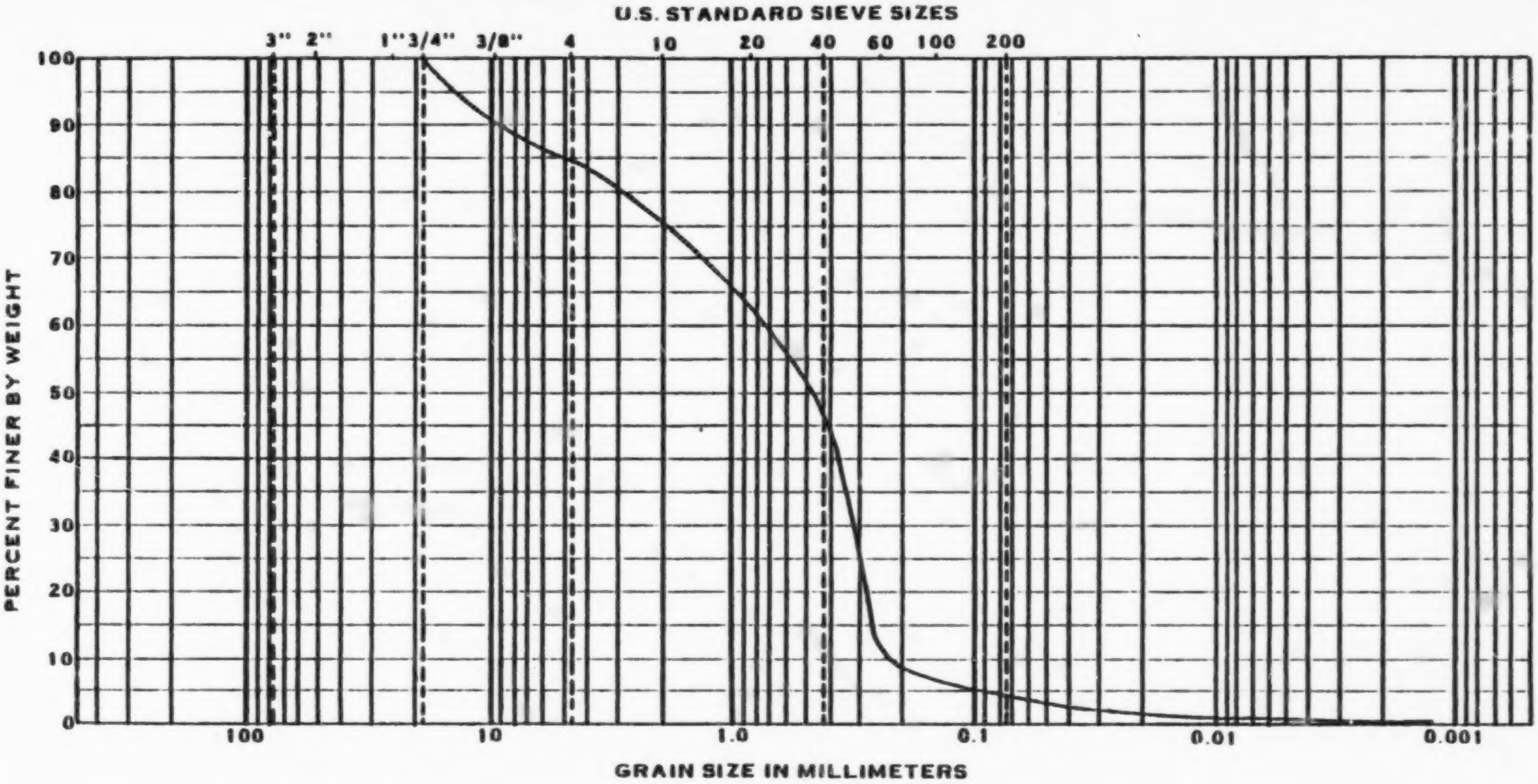

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-208	60'				

PREPARED ________ DATE ____
REVISED ________ DATE ____
REVISED ________ DATE ____
APPROVED ________ DATE ____

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TABLE NO. B - 4.82

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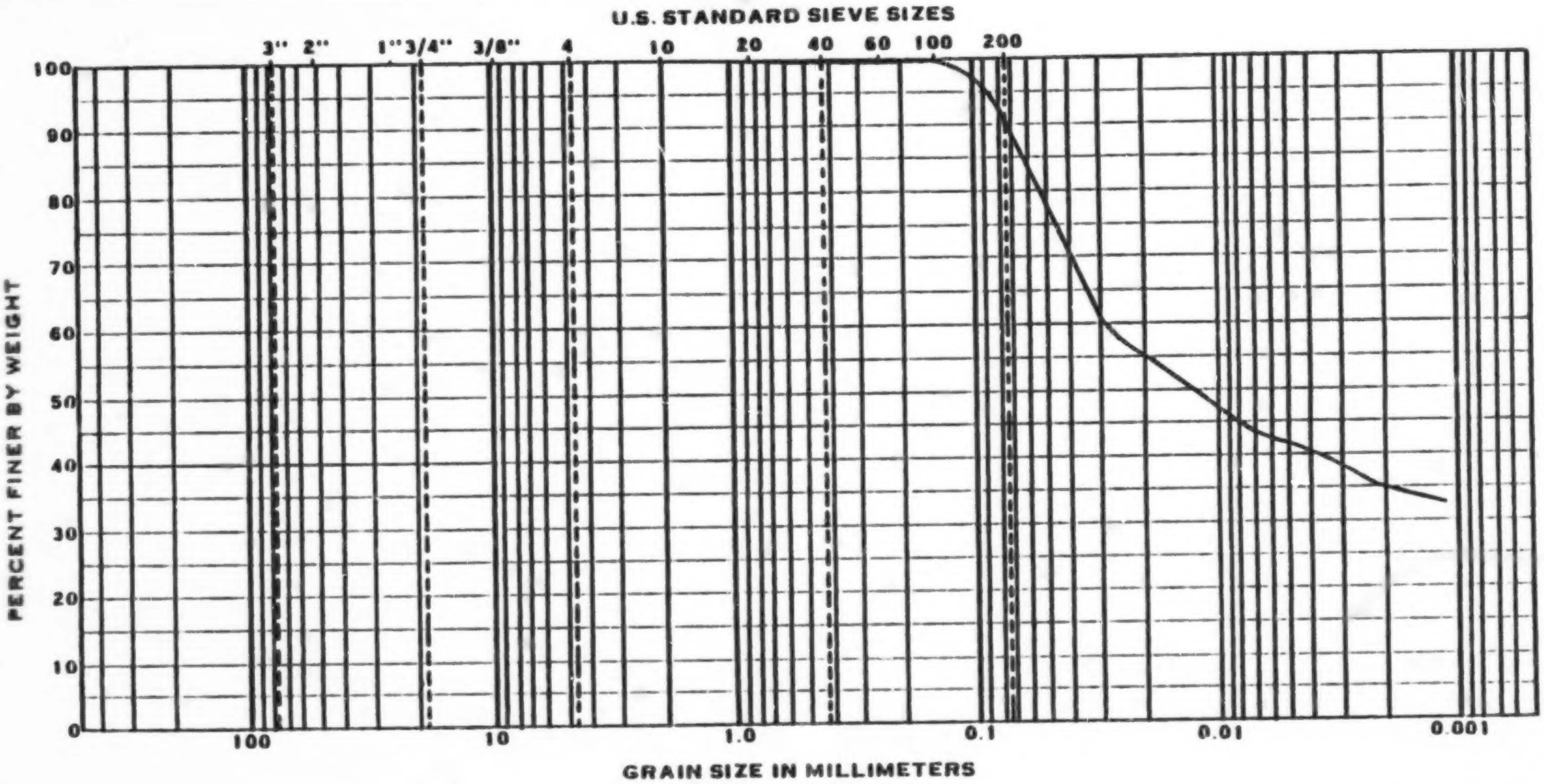

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-209	30'				

PREPARED ______ DATE ____
REVISED ______ DATE ____
REVISED ______ DATE ____
APPROVED ______ DATE ____

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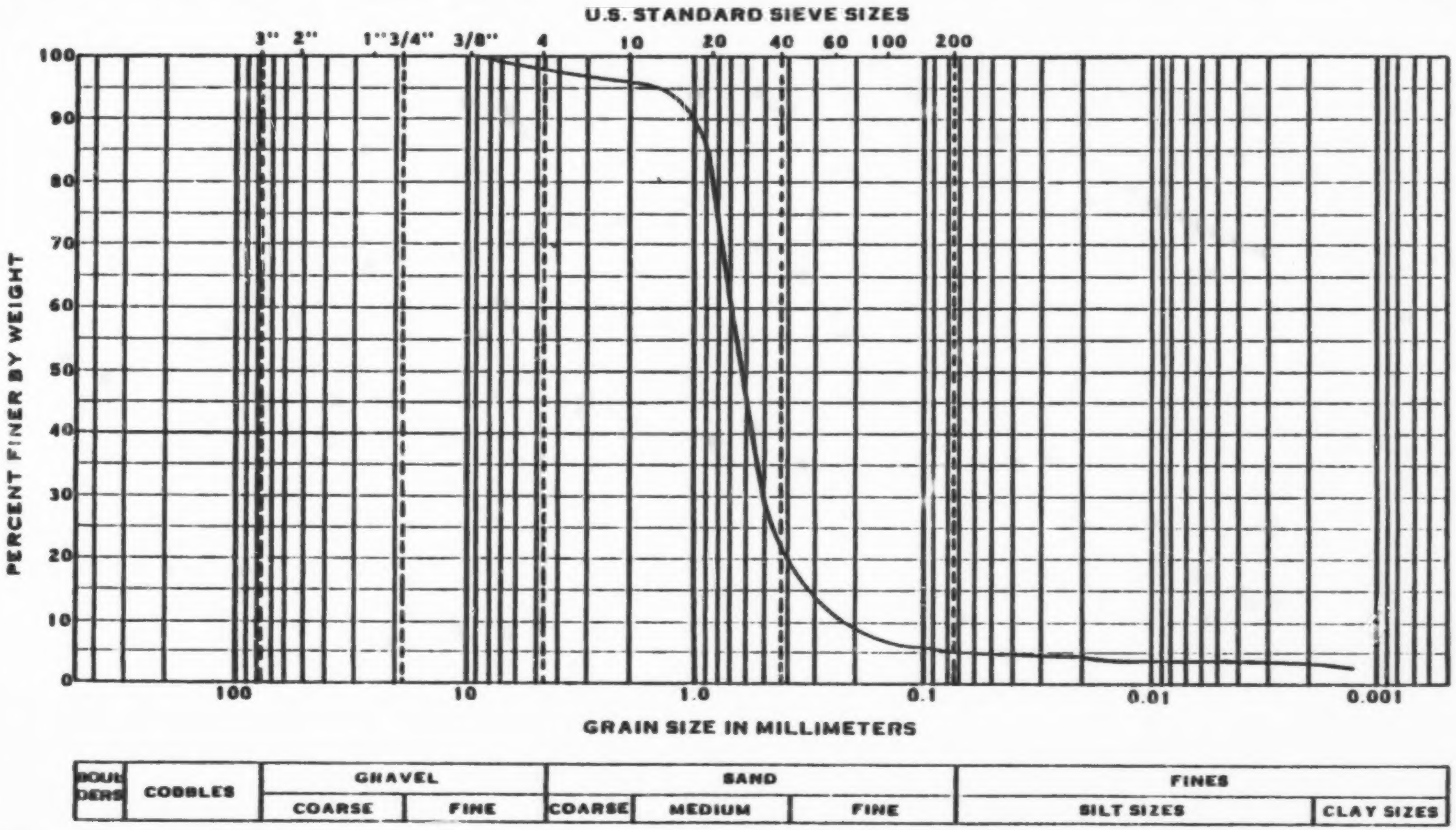
TABLE NO. B - 4.83



BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-209	69' - 70.5				

PREPARED ________ DATE ____
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REVISED ________ DATE ____
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TABLE NO. B - 4.84

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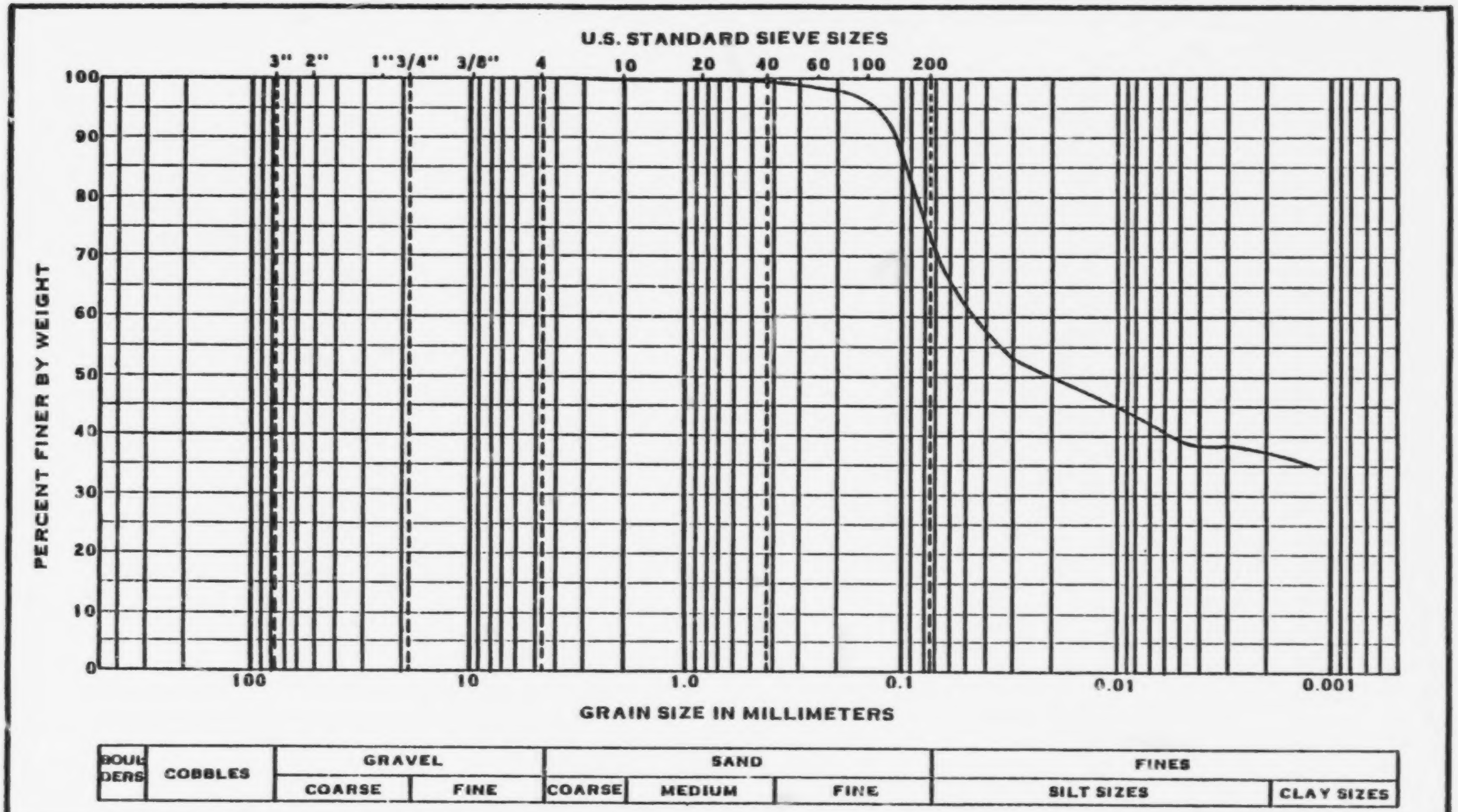

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-210	9 - 10.5				

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

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TABLE NO. B - 4.05

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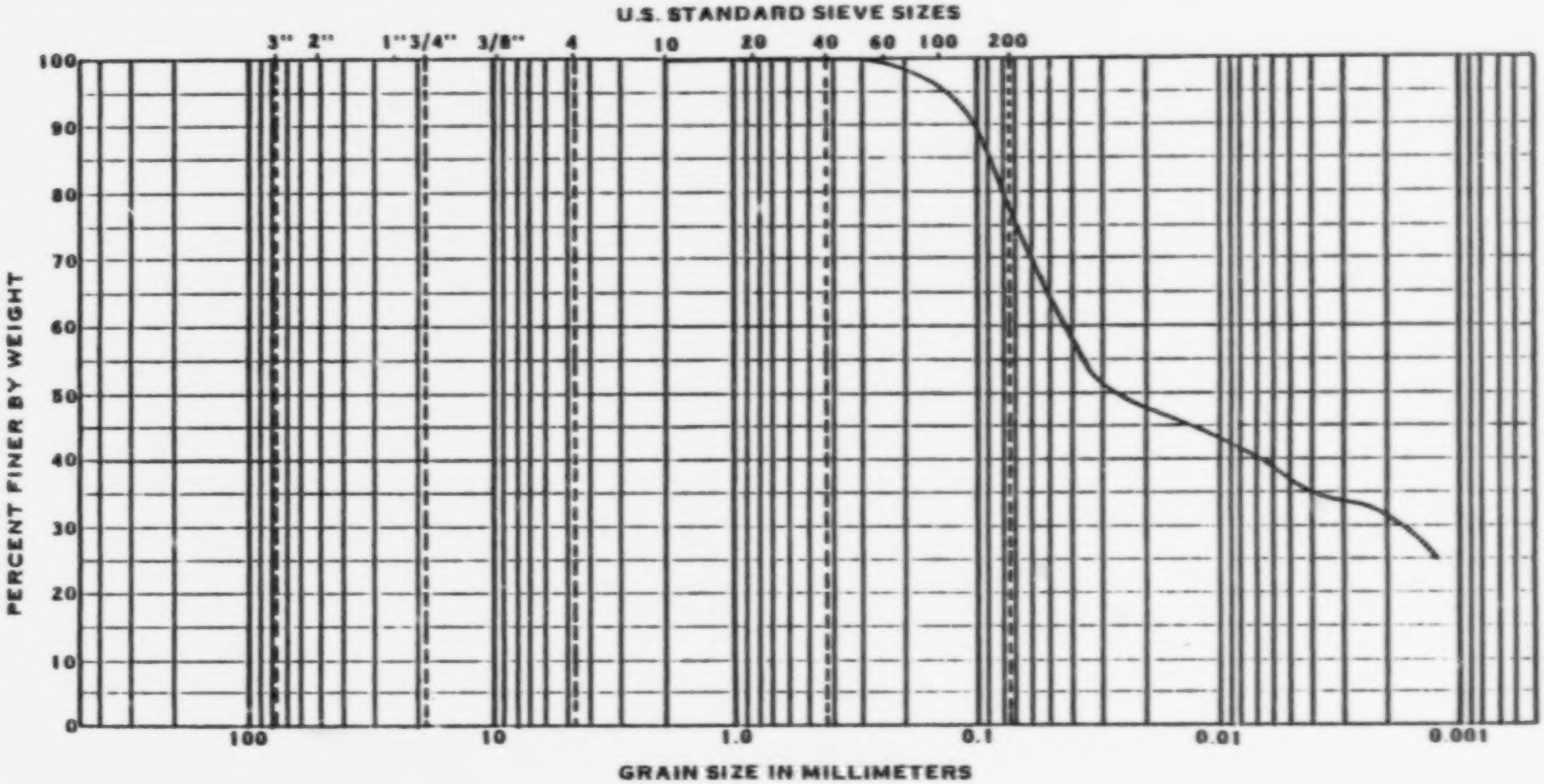

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-210	15'				

PREPARED _______ DATE _____

REVISED _______ DATE _____

REVISED _______ DATE _____

APPROVED _______ DATE _____

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TABLE NO. B - 4.86

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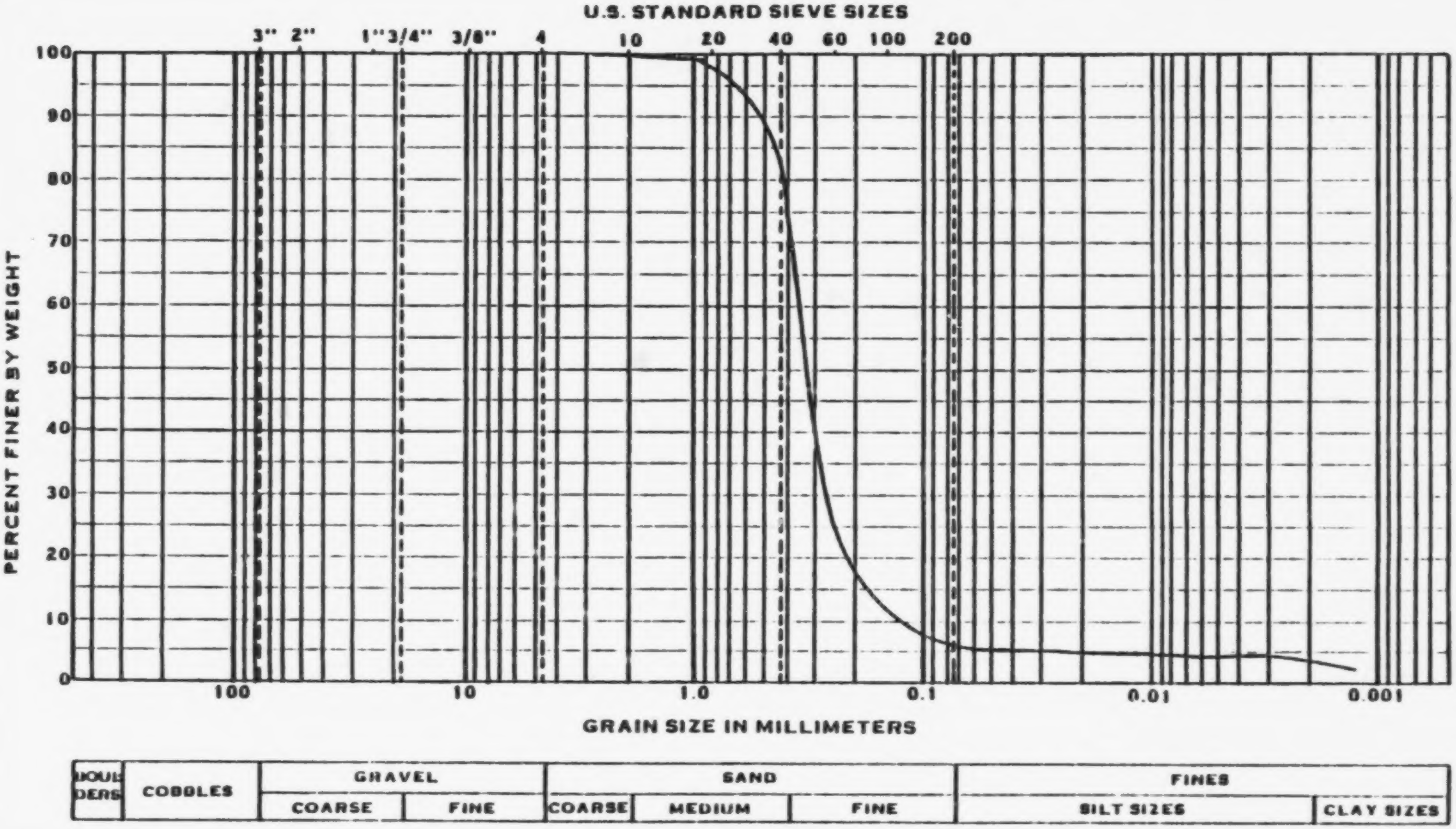

BORING NO	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-210	55'				

PREPARED ______ DATE _____
REVISED ______ DATE _____
REVISED ______ DATE _____
APPROVED ______ DATE _____

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TABLE NO. B - 4.87

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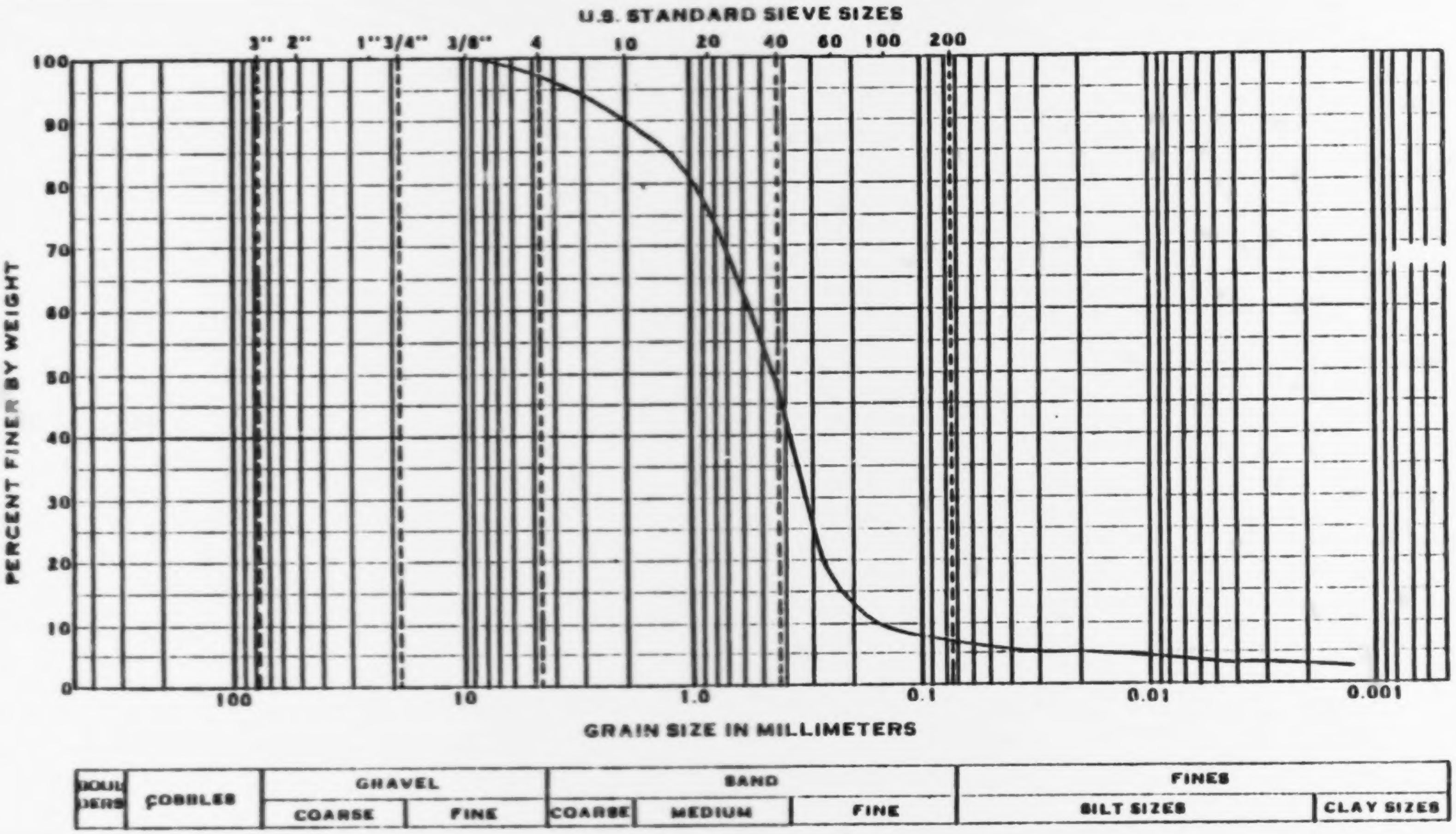

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-211	35'				

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
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TABLE NO. B - 4.88

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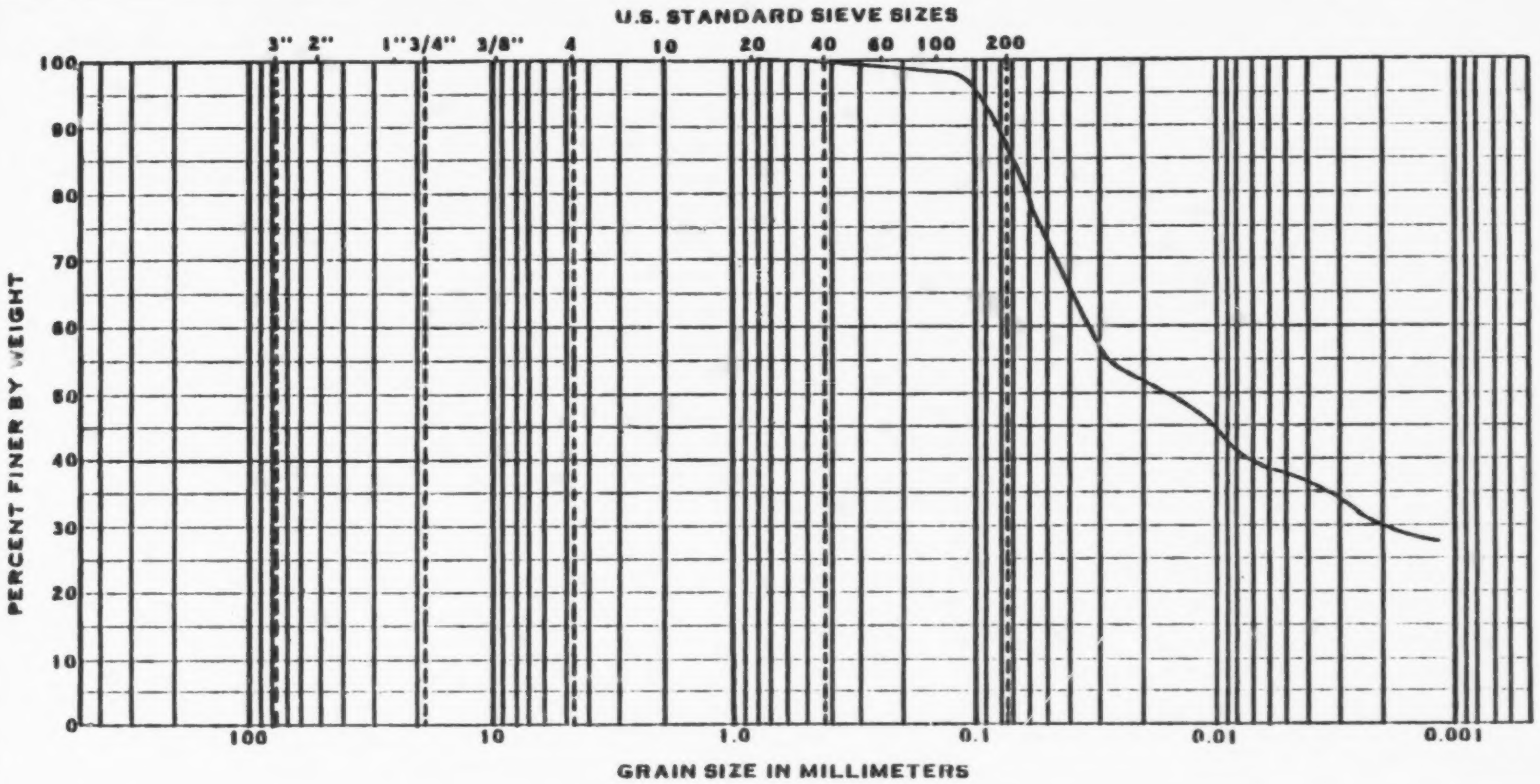

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-211	90'				

PREPARED ________ DATE ____
REVISED ________ DATE ____
REVISED ________ DATE ____
APPROVED ________ DATE ____

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TABLE NO. B - 4.89

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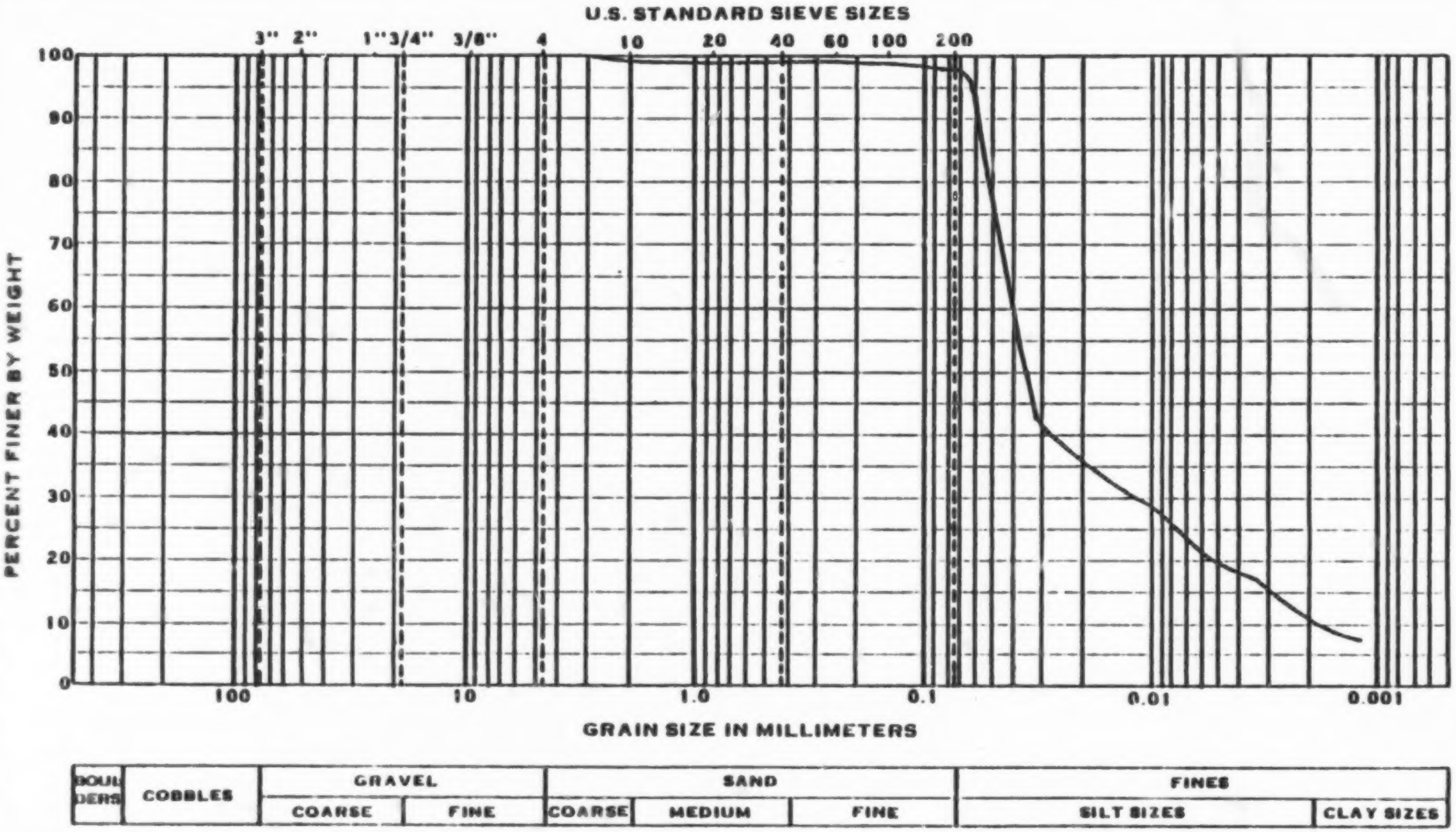

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-212	40'				

PREPARED ______ DATE ______

REVISED ______ DATE ______

REVISED ______ DATE ______

APPROVED ______ DATE ______

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TABLE NO. B - 4.90

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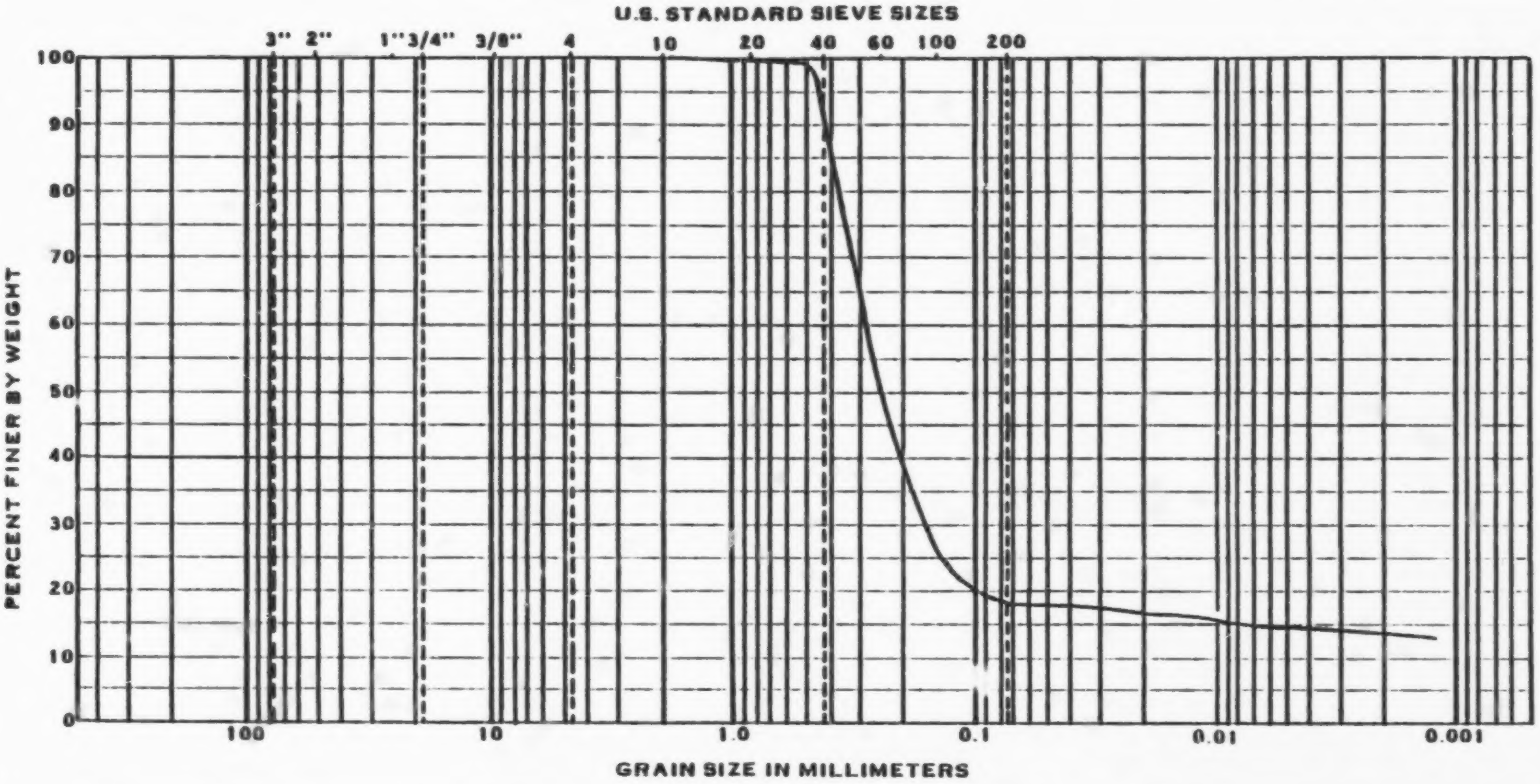

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-215	10'				

PREPARED ______ DATE ____
REVISED ______ DATE ____
REVISED ______ DATE ____
APPROVED ______ DATE ____

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TABLE NO. B - 4.91

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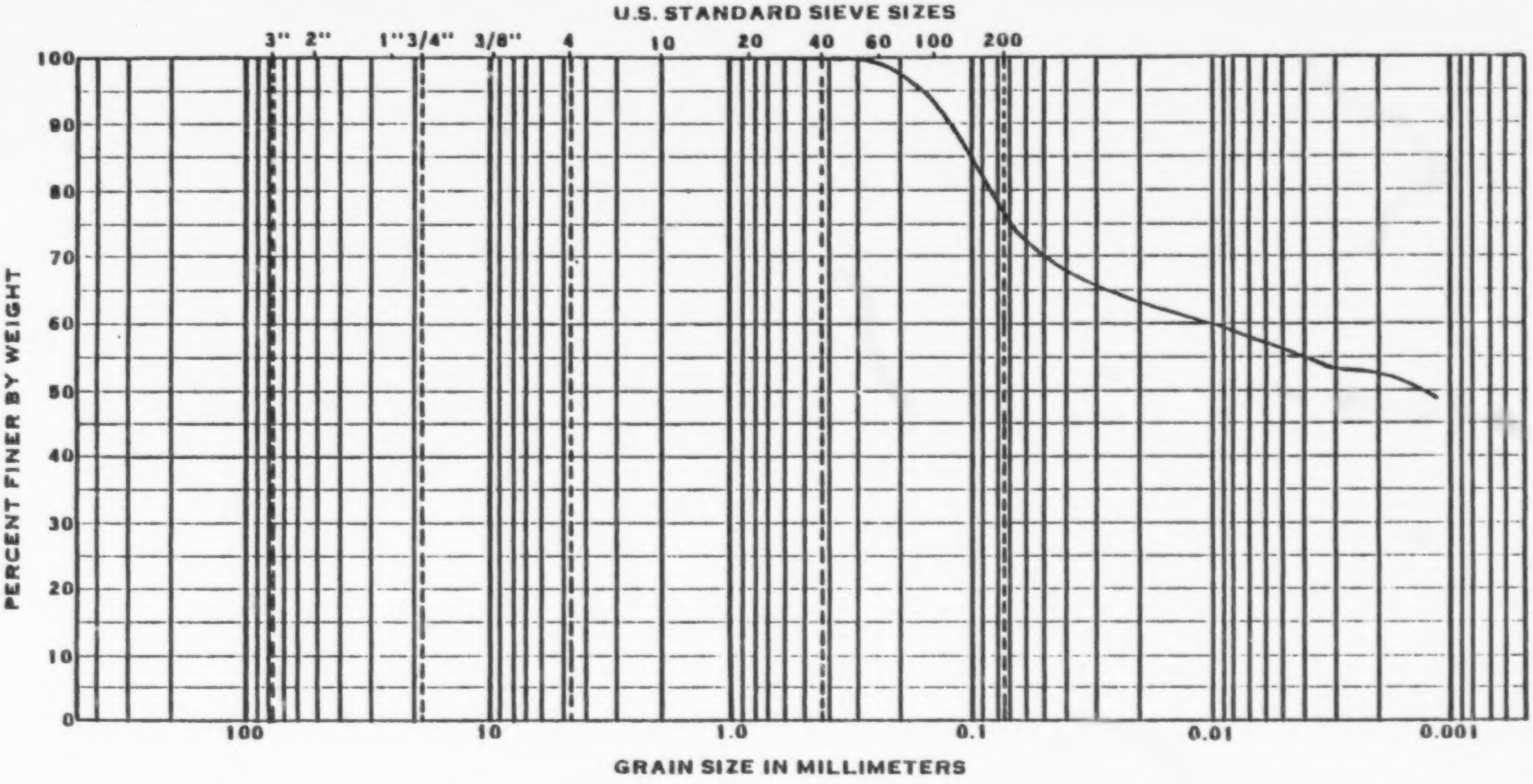

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-215	70'				

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
APPROVED ________ DATE ______

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LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX B-4
RICHTON DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B-4.92

290

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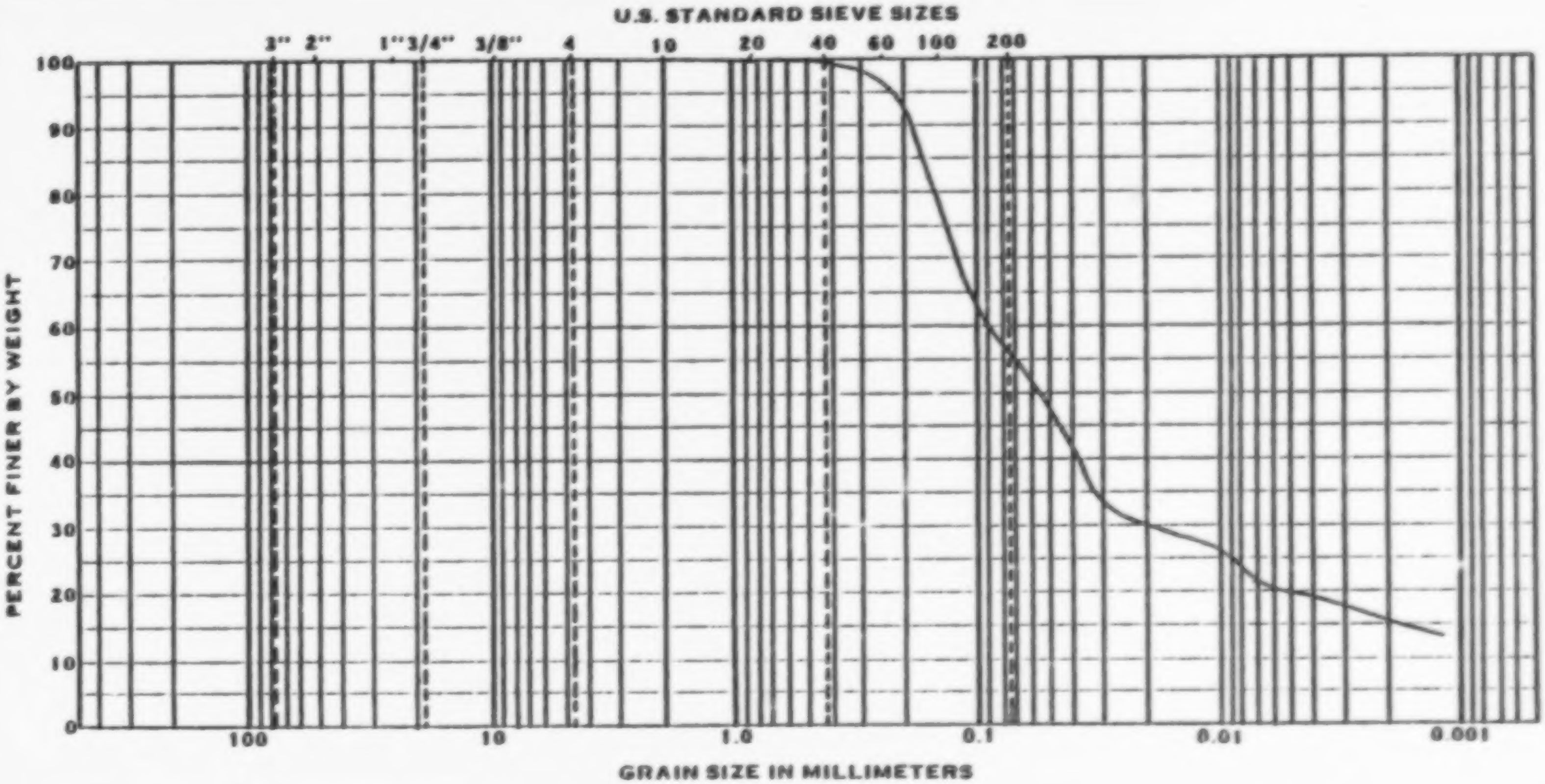

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	L.L.	PL	PI
MRIG-215	100'				

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
APPROVED ________ DATE ______

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RICHTON DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.93

291

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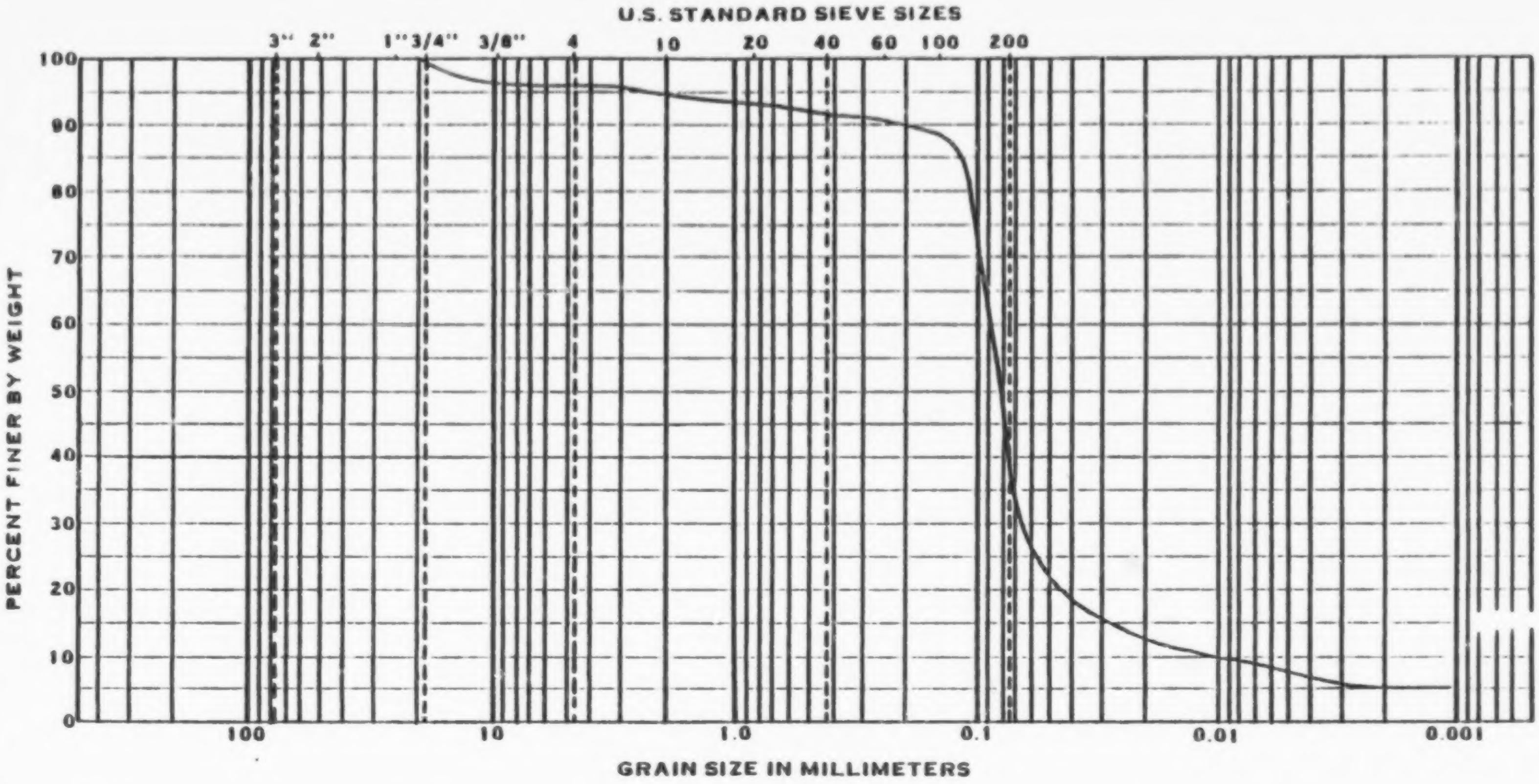

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-216	70'				

PREPARED _______ DATE _____
REVISED _______ DATE _____
REVISED _______ DATE _____
APPROVED _______ DATE _____

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APPENDIX B-4
RICHTON DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.94

292

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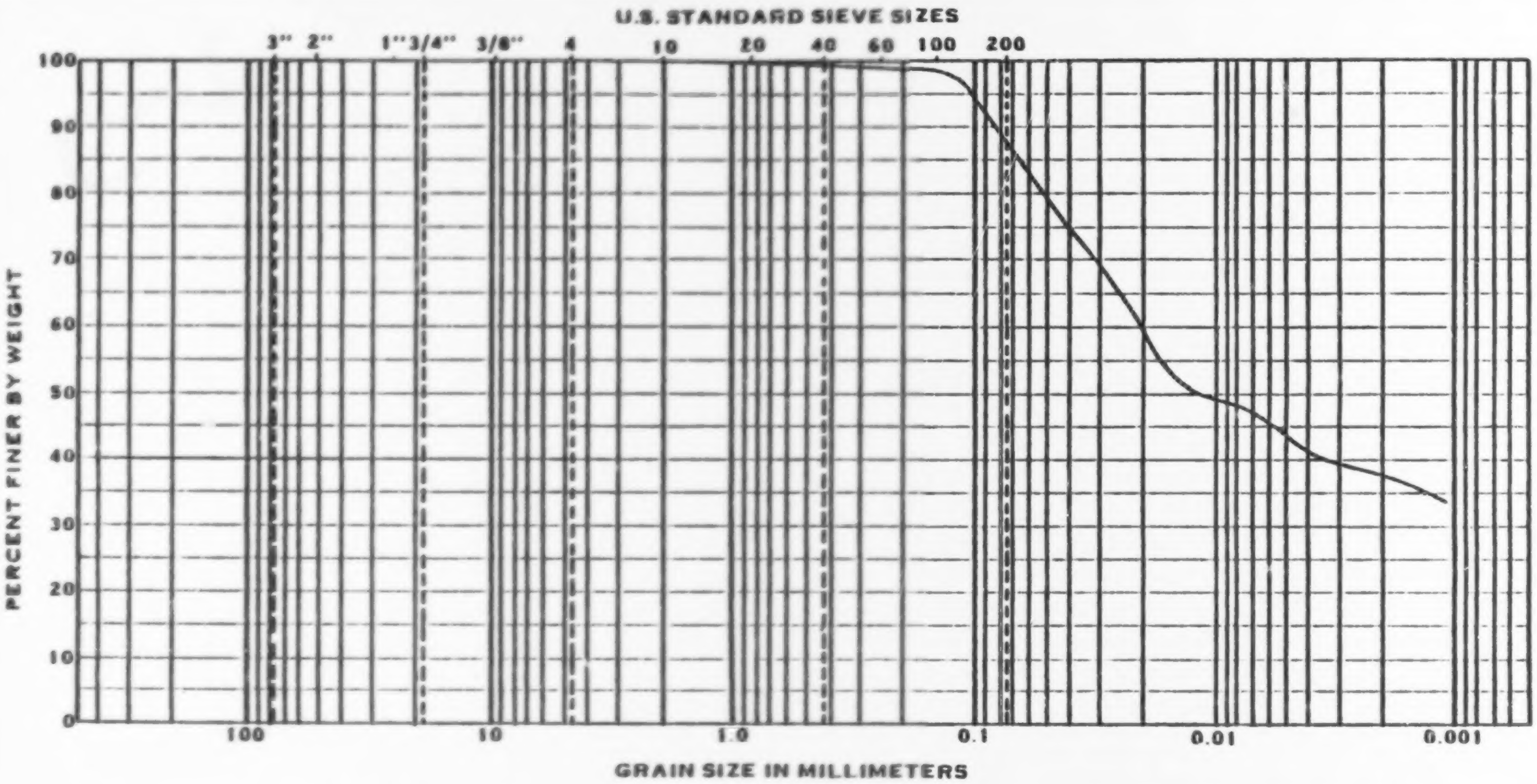

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-217	25'				

PREPARED ________ DATE ____
REVISED ________ DATE ____
REVISED ________ DATE ____
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RICHTON DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.95

293

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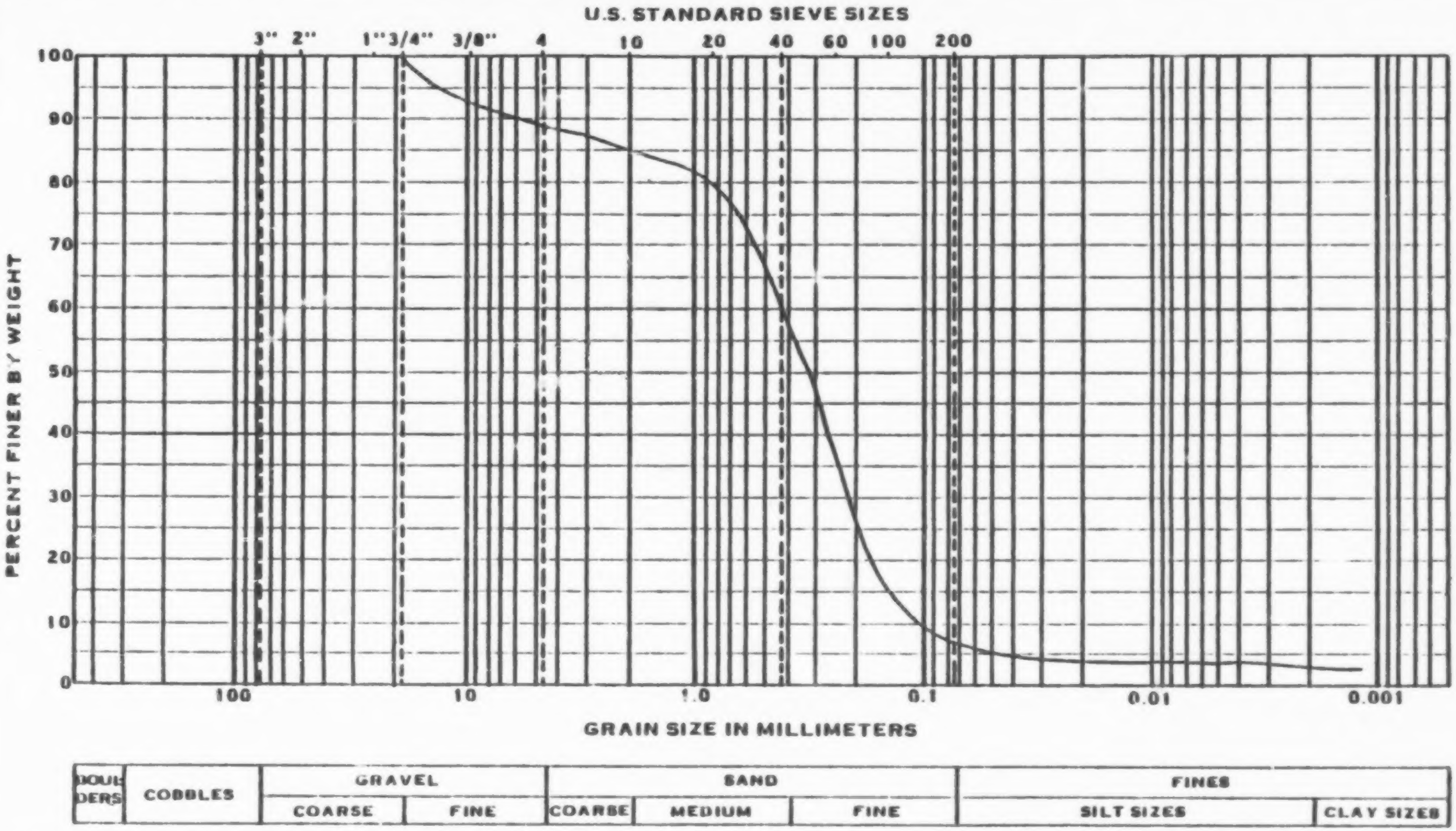

BORING NO	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-217	60'				

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
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TABLE NO. B - 4.96

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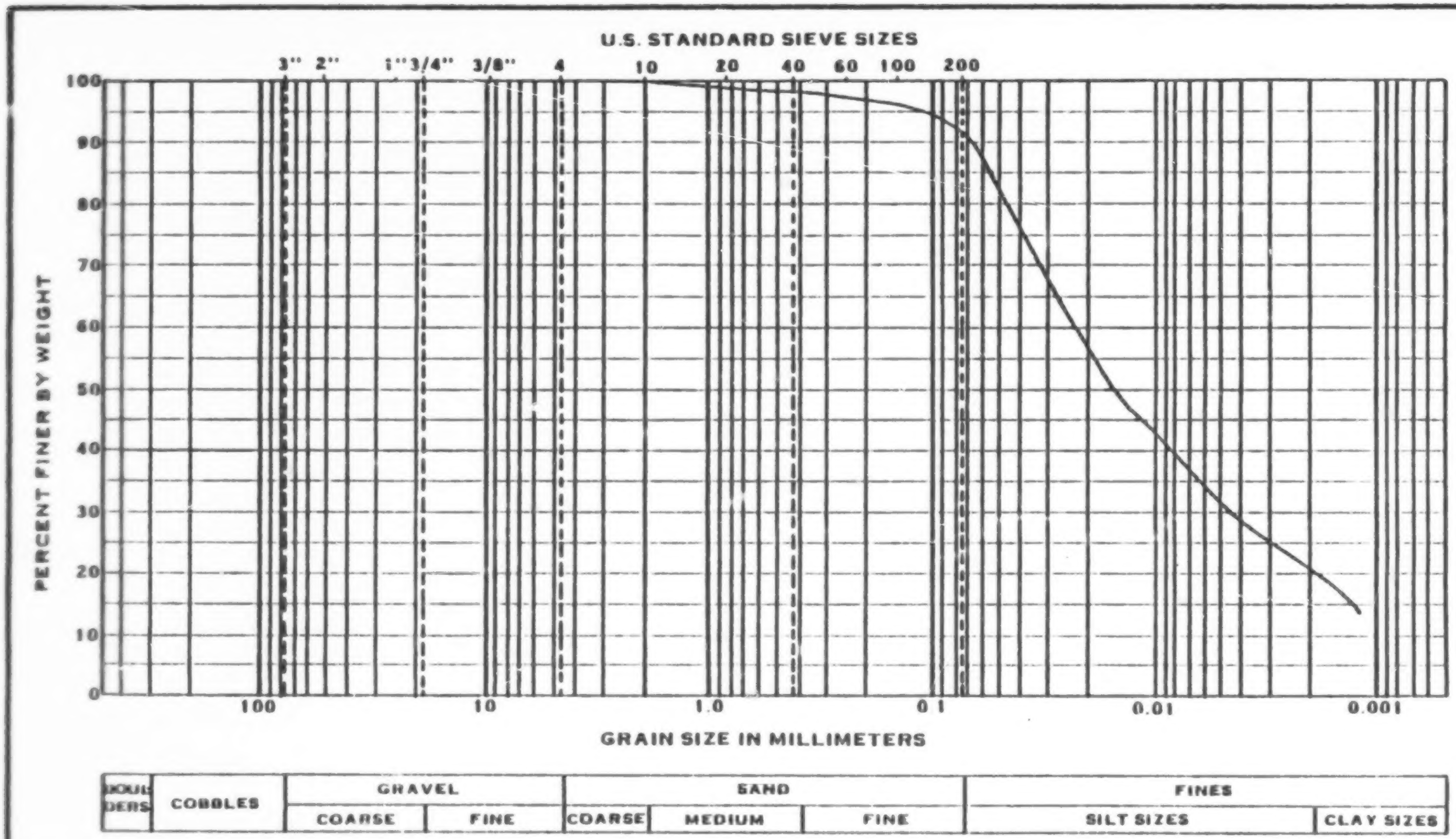

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-217	120'				

PREPARED ______ DATE ____
REVISED ______ DATE ____
REVISED ______ DATE ____
APPROVED ______ DATE ____

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TABLE NO. B - 4.97

295

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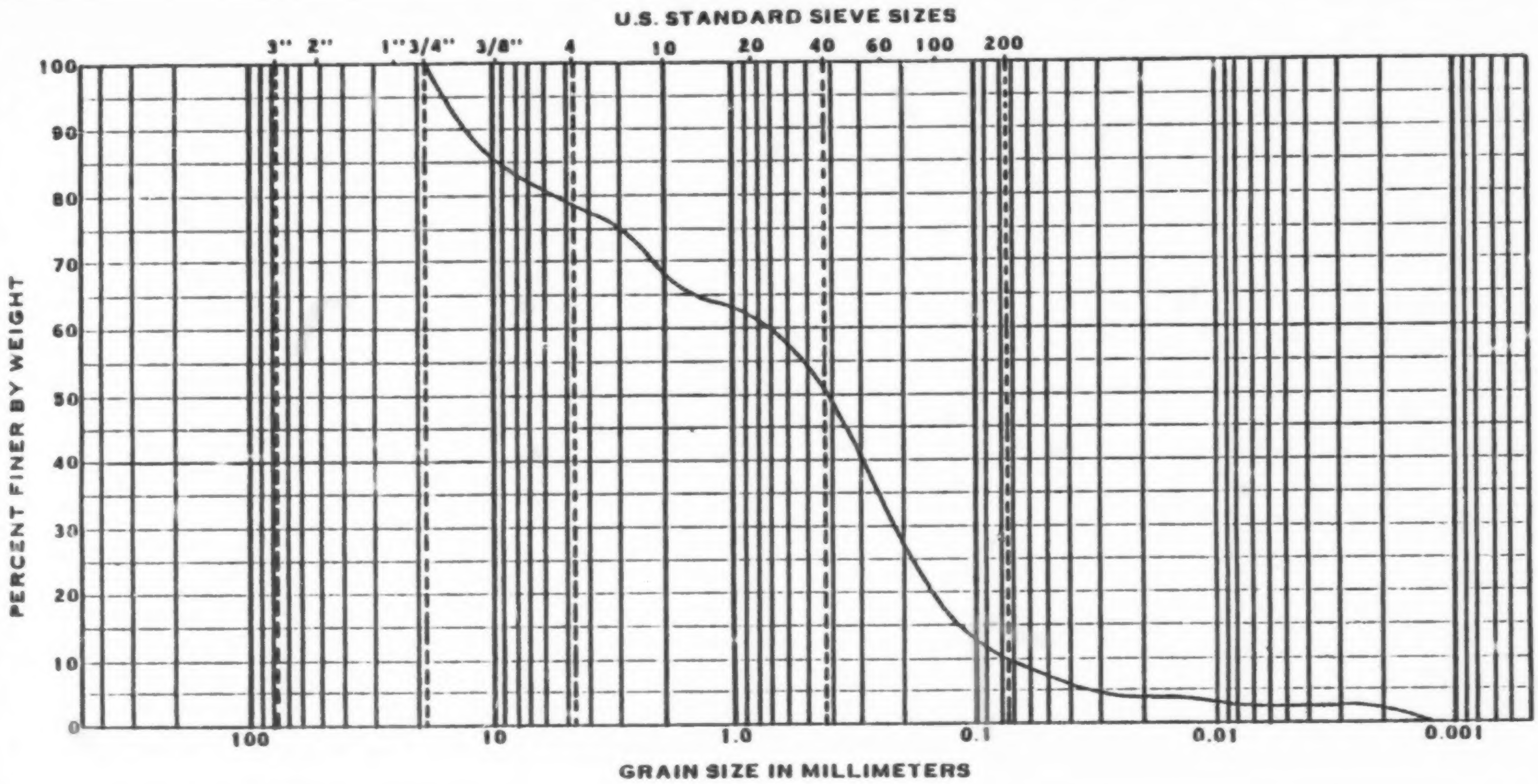

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-217	180'				

PREPARED ________ DATE ____
REVISED ________ DATE ____
REVISED ________ DATE ____
APPROVED ________ DATE ____

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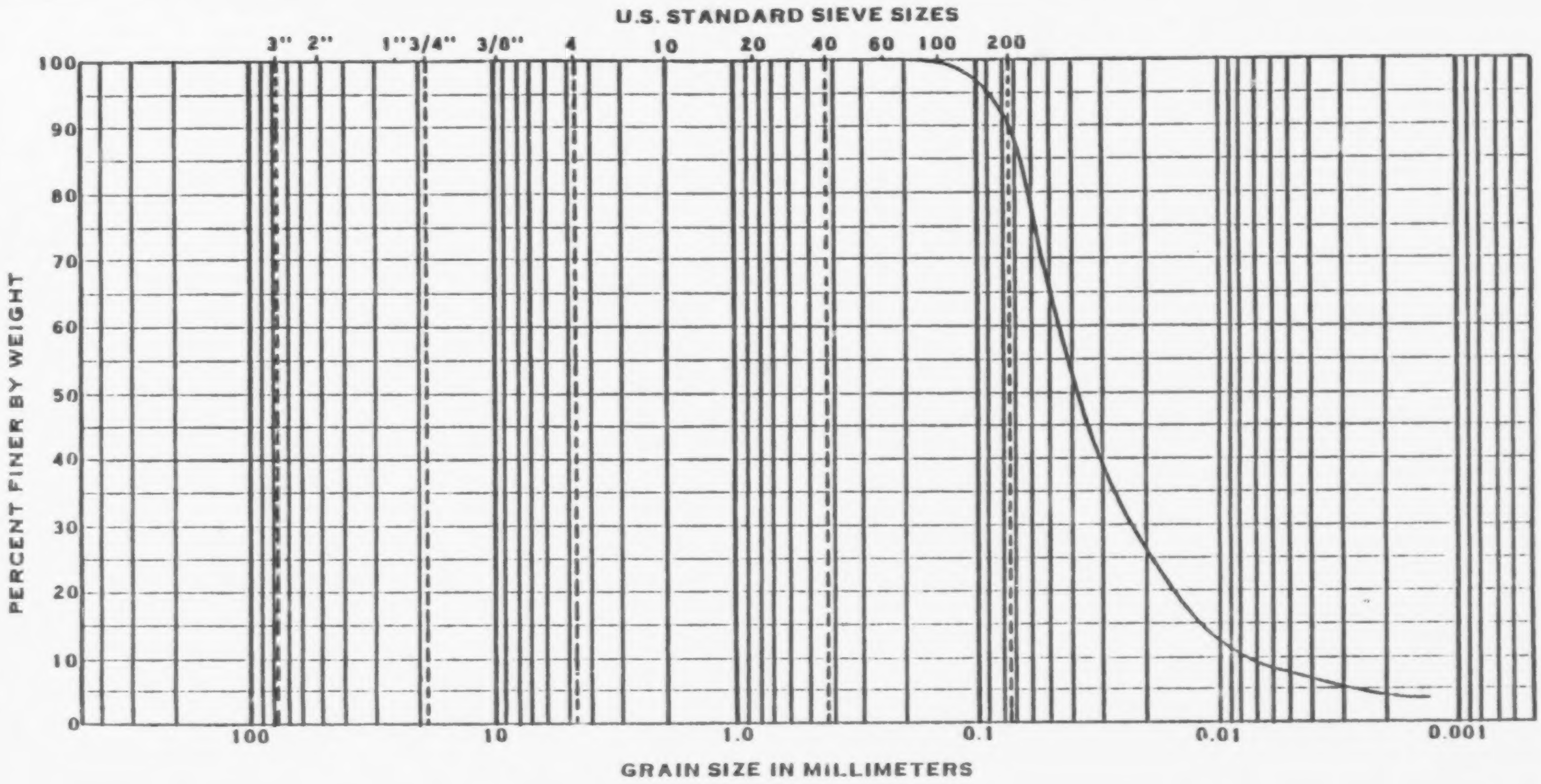
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.98



BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-219	130'				

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
APPROVED ________ DATE ______

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GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.99

297

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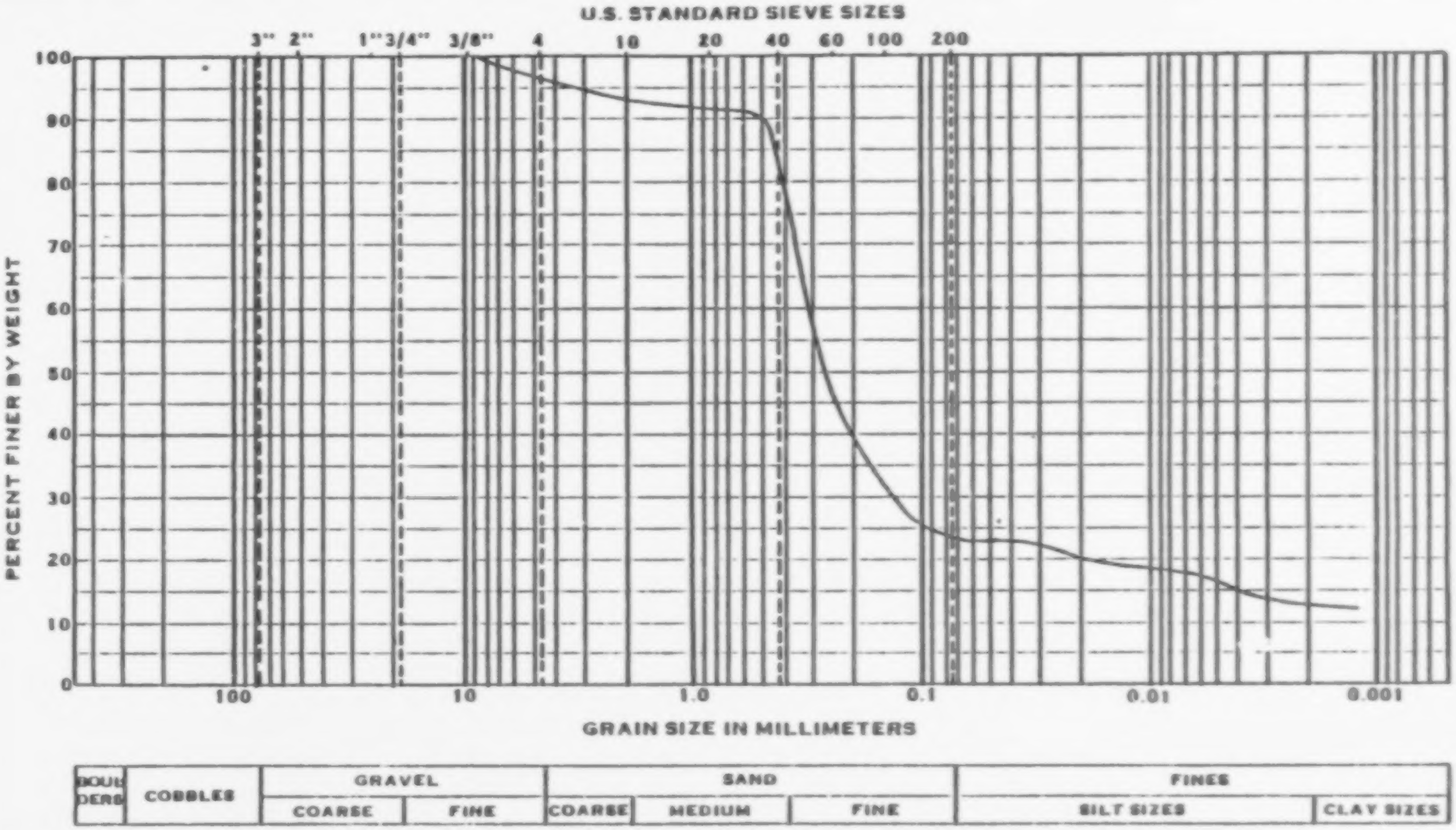

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-220	109' - 110.5'				

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
APPROVED ________ DATE ______

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TABLE NO. B - 4.100

298

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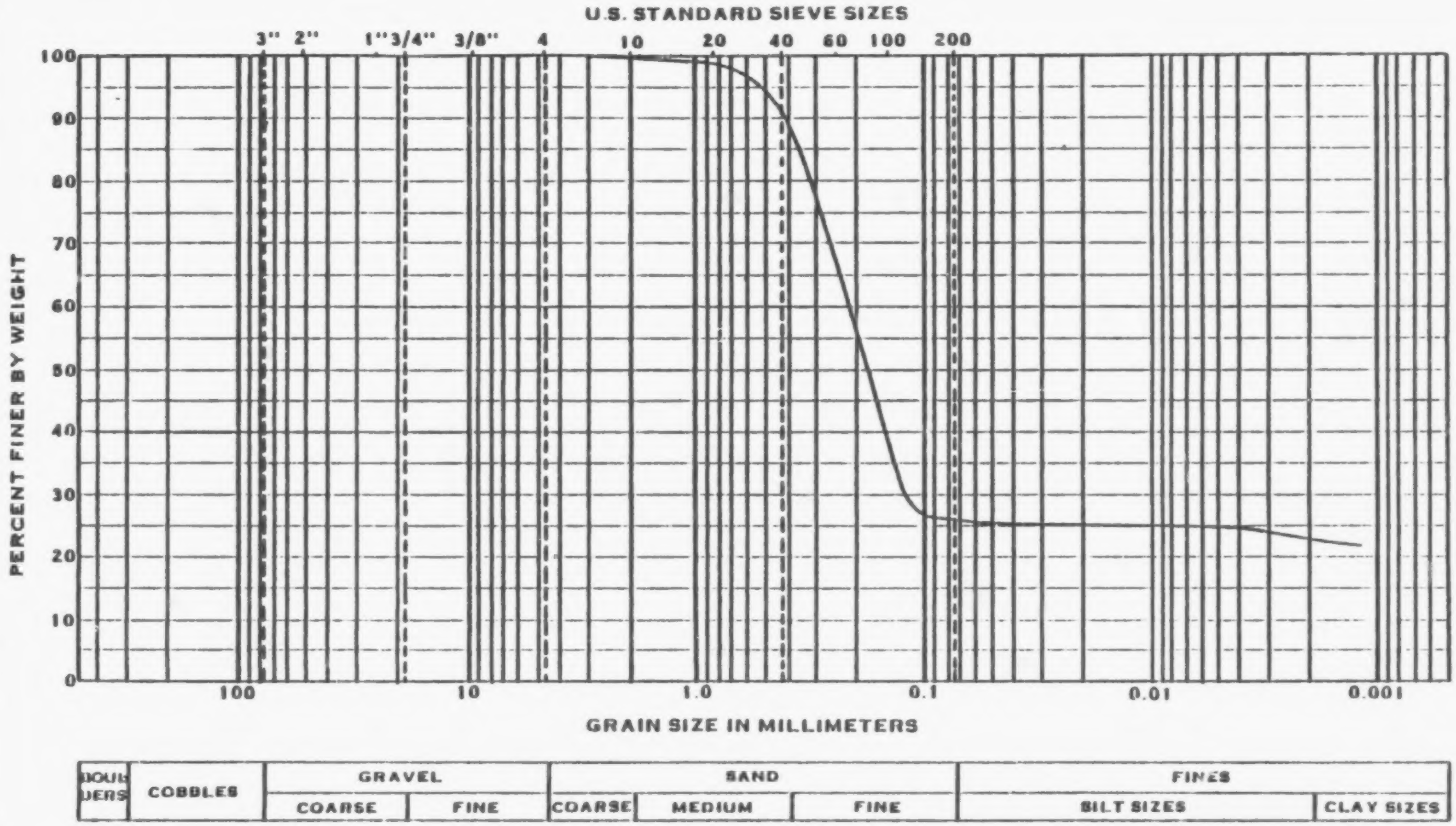

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG - 223	9' - 10.5'				

PREPARED ________ DATE ____
REVISED ________ DATE ____
REVISED ________ DATE ____
APPROVED ________ DATE ____

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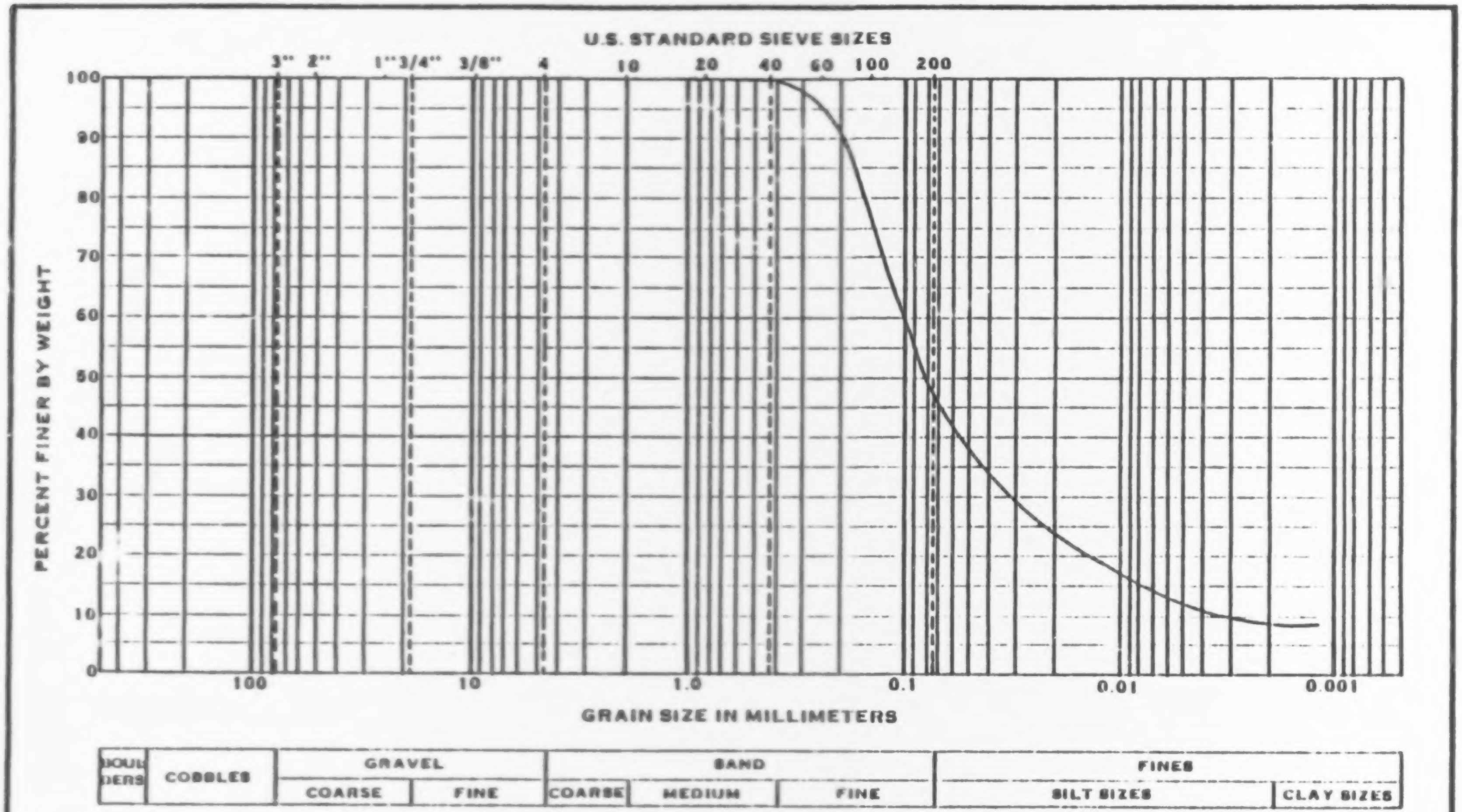
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.101



BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-223	120'				

PREPARED ________ DATE ____
REVISED ________ DATE ____
REVISED ________ DATE ____
APPROVED ________ DATE ____

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TABLE NO. B - 4.102

300

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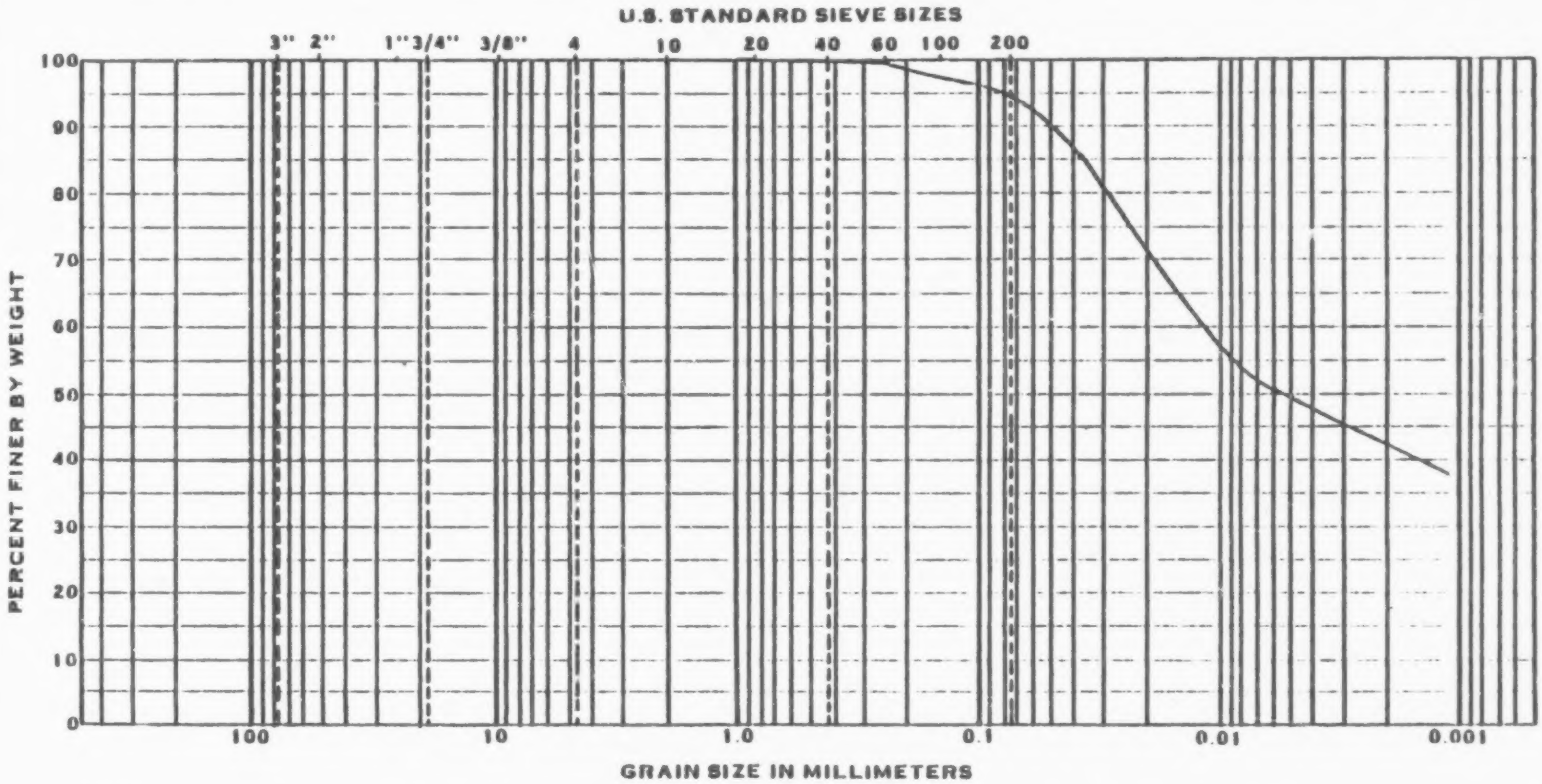

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-224	4'- 5.5'				

PREPARED ________ DATE ________

REVISED ________ DATE ________

REVISED ________ DATE ________

APPROVED ________ DATE ________

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TABLE NO. B - 4.103

301

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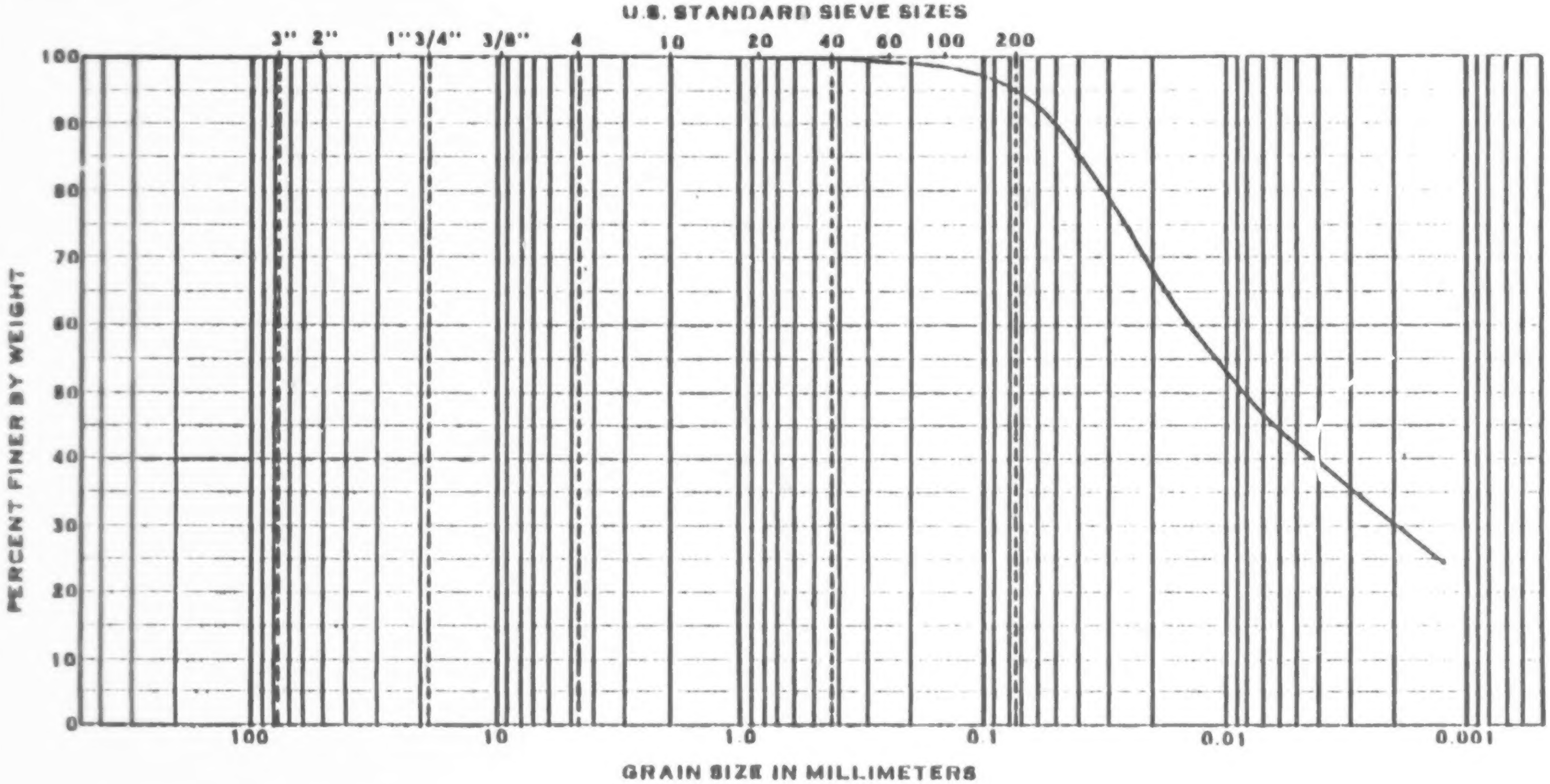

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-224	49' - 50.5'				

PREPARED ________ DATE ____
REVISED ________ DATE ____
REVISED ________ DATE ____
APPROVED ________ DATE ____

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TABLE NO. B - 4.104

302

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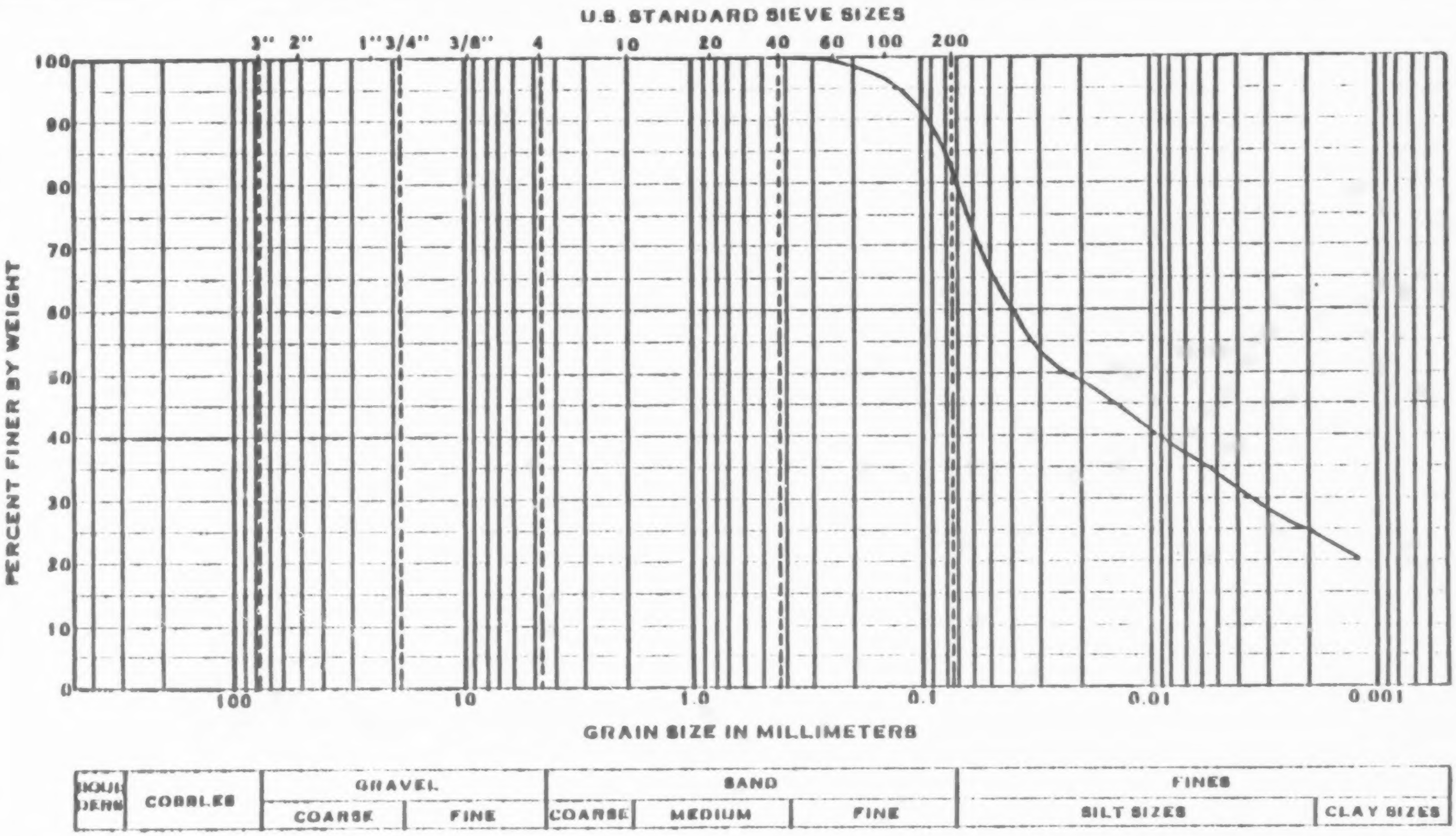

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-227	120'				

PREPARED ________ DATE ________
REVISED ________ DATE ________
REVISED ________ DATE ________
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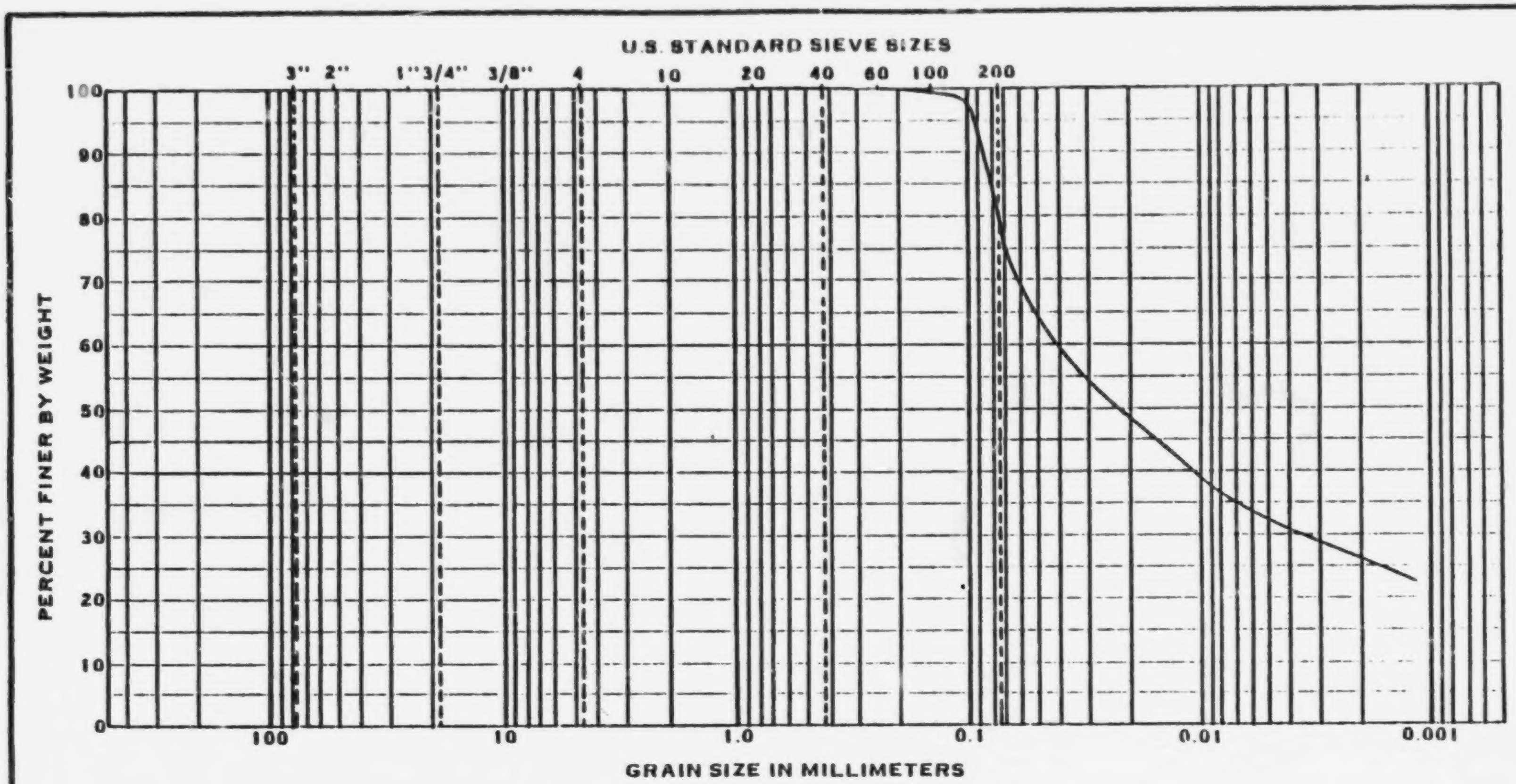
TABLE NO. B - 4.105

303 **BEST DOCUMENT AVAILABLE**



BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-228	19' - 20.5				

PREPARED ________ DATE ____
REVISED ________ DATE ____
REVISED ________ DATE ____
APPROVED ________ DATE ____

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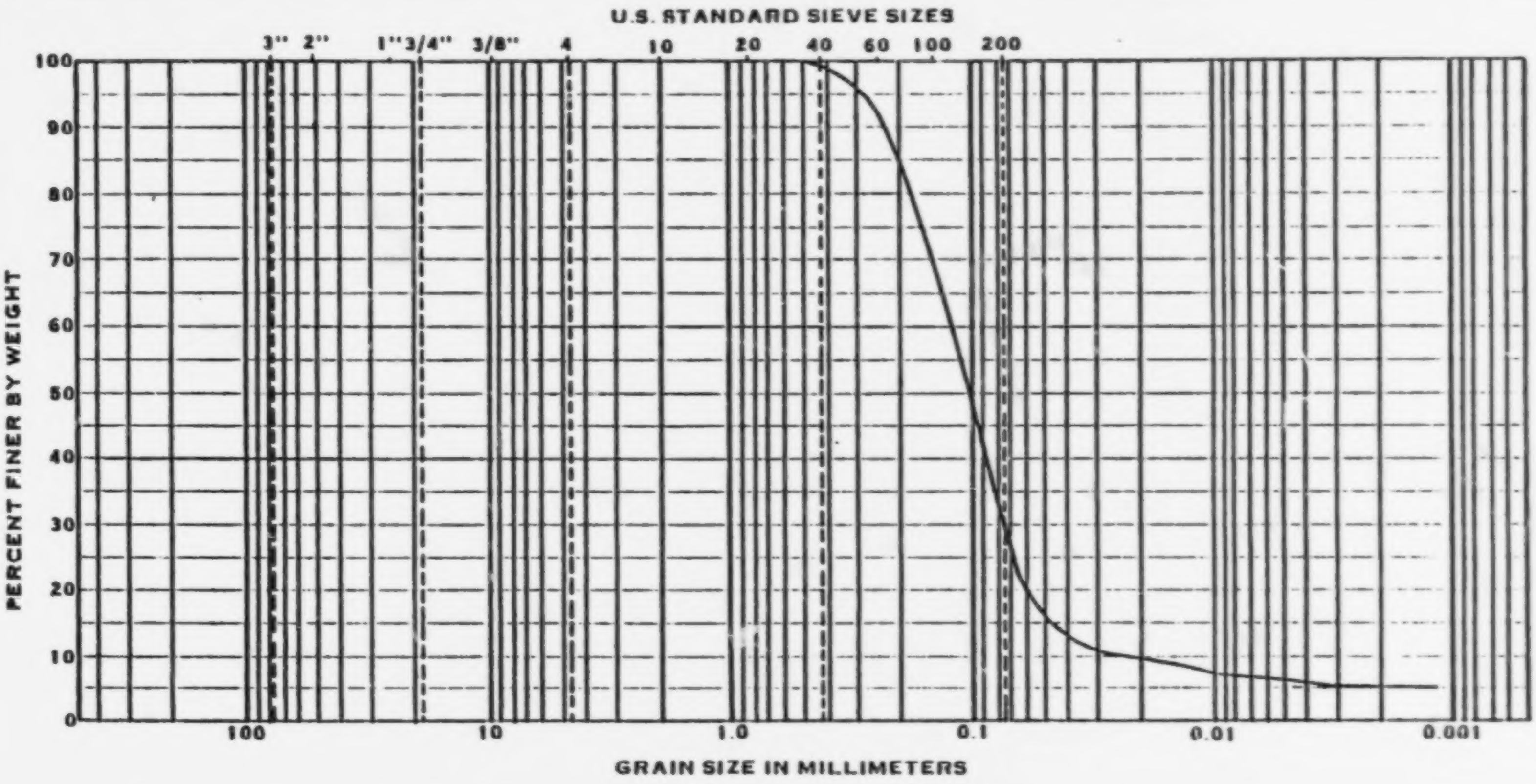
RICHTON DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.106



BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-229	14' - 15.5'				

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
APPROVED ________ DATE ______

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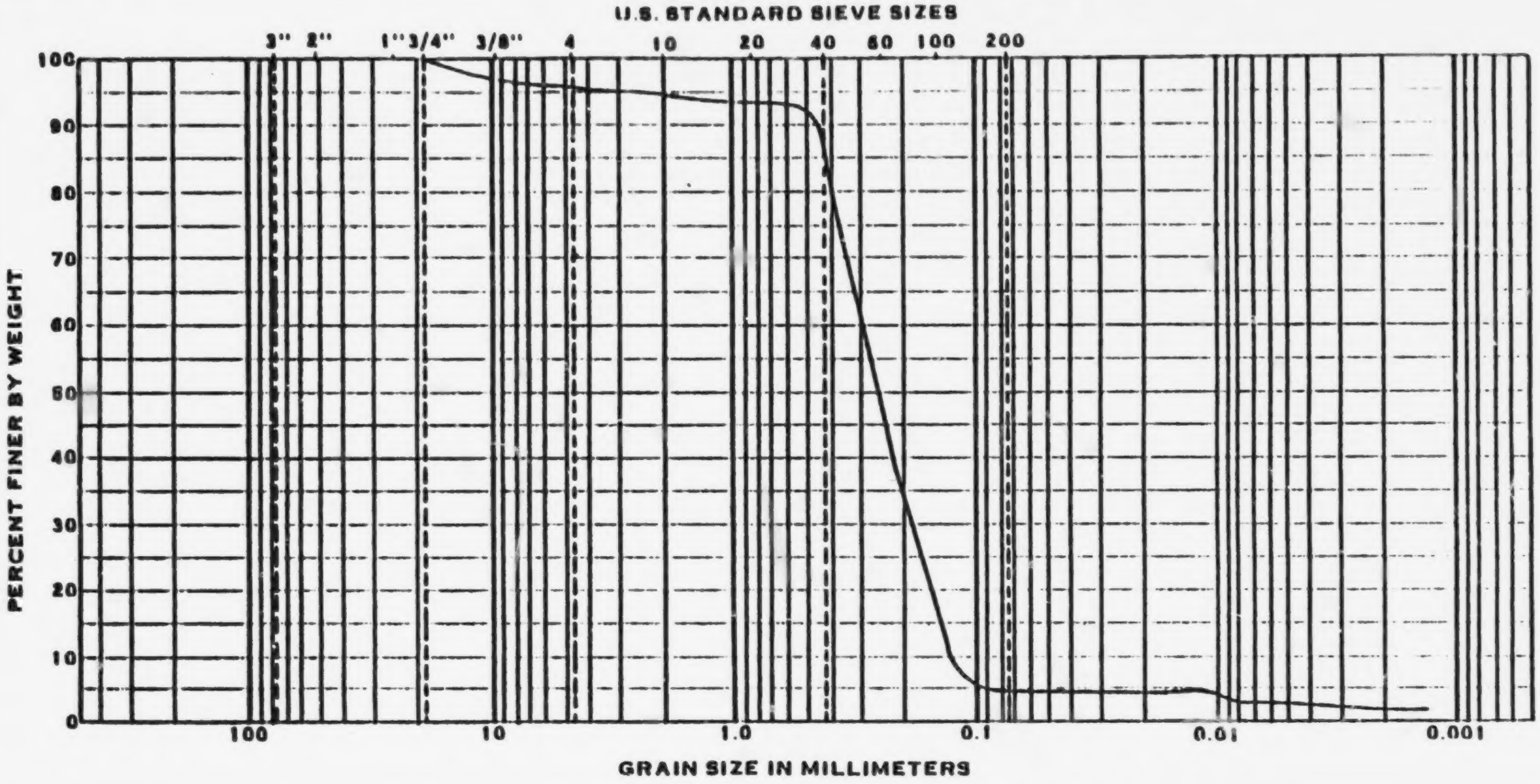
TABLE NO. B - 4.107



BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-225	29' - 30.5'				

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

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GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.108

306

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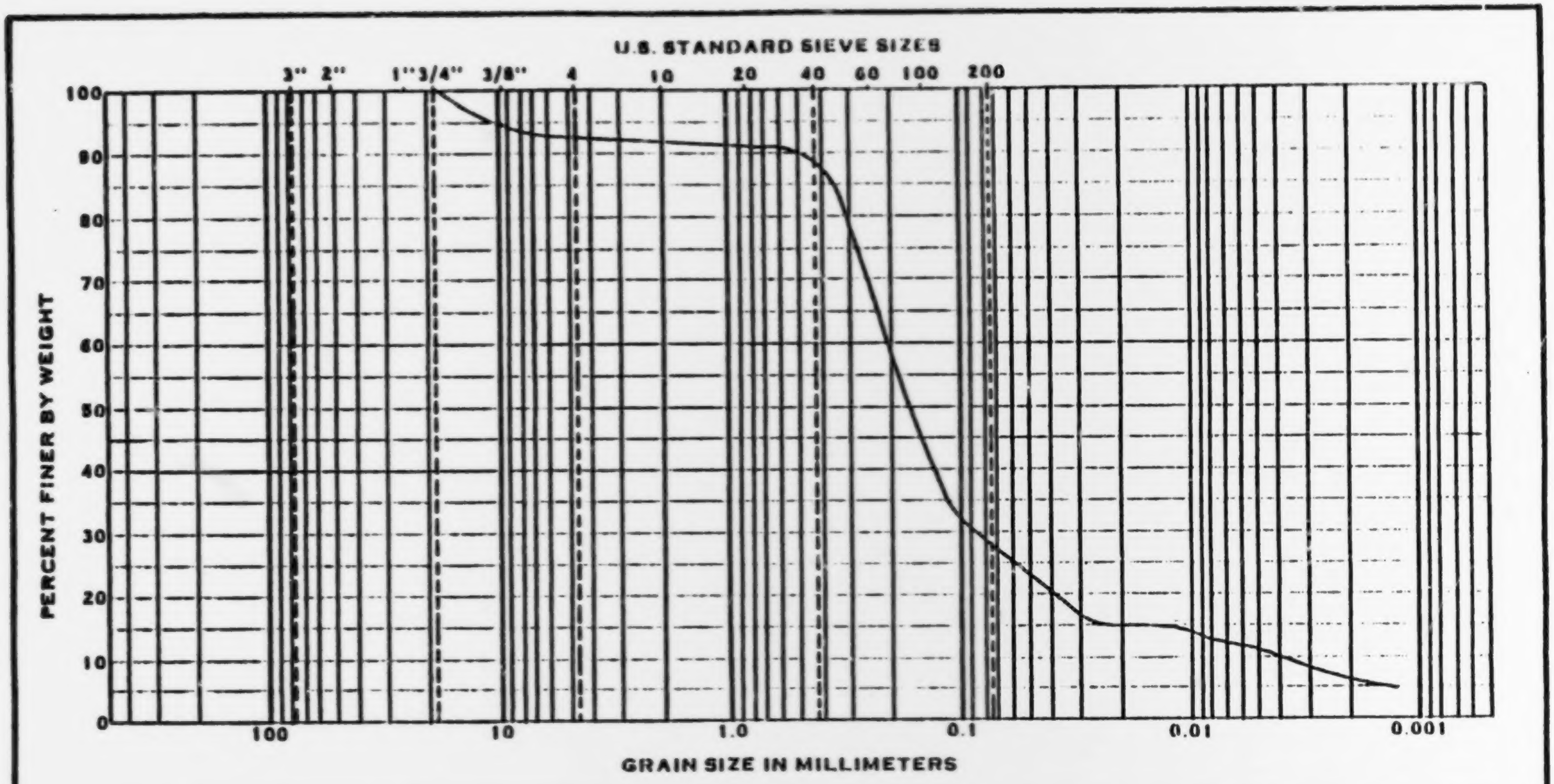

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG229	6.4' - 65.5'				

PREPARED ________ DATE ______
REVISED ________ DATE ______
REVISED ________ DATE ______
APPROVED ________ DATE ______

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GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.109

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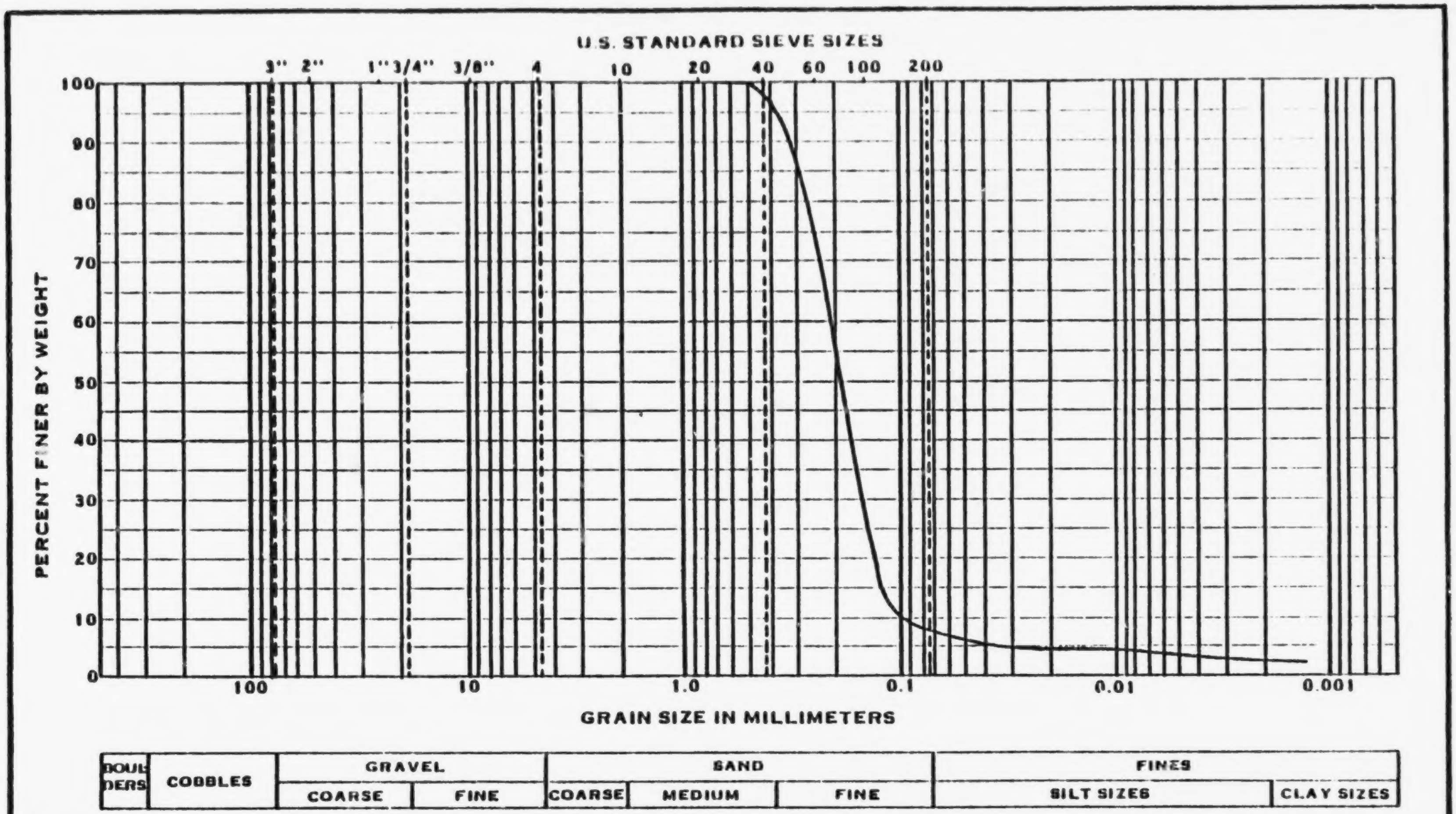

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-229	99'- 100.5'				

PREPARED ______ DATE ____
REVISED ______ DATE ____
REVISED ______ DATE ____
APPROVED ______ DATE ____

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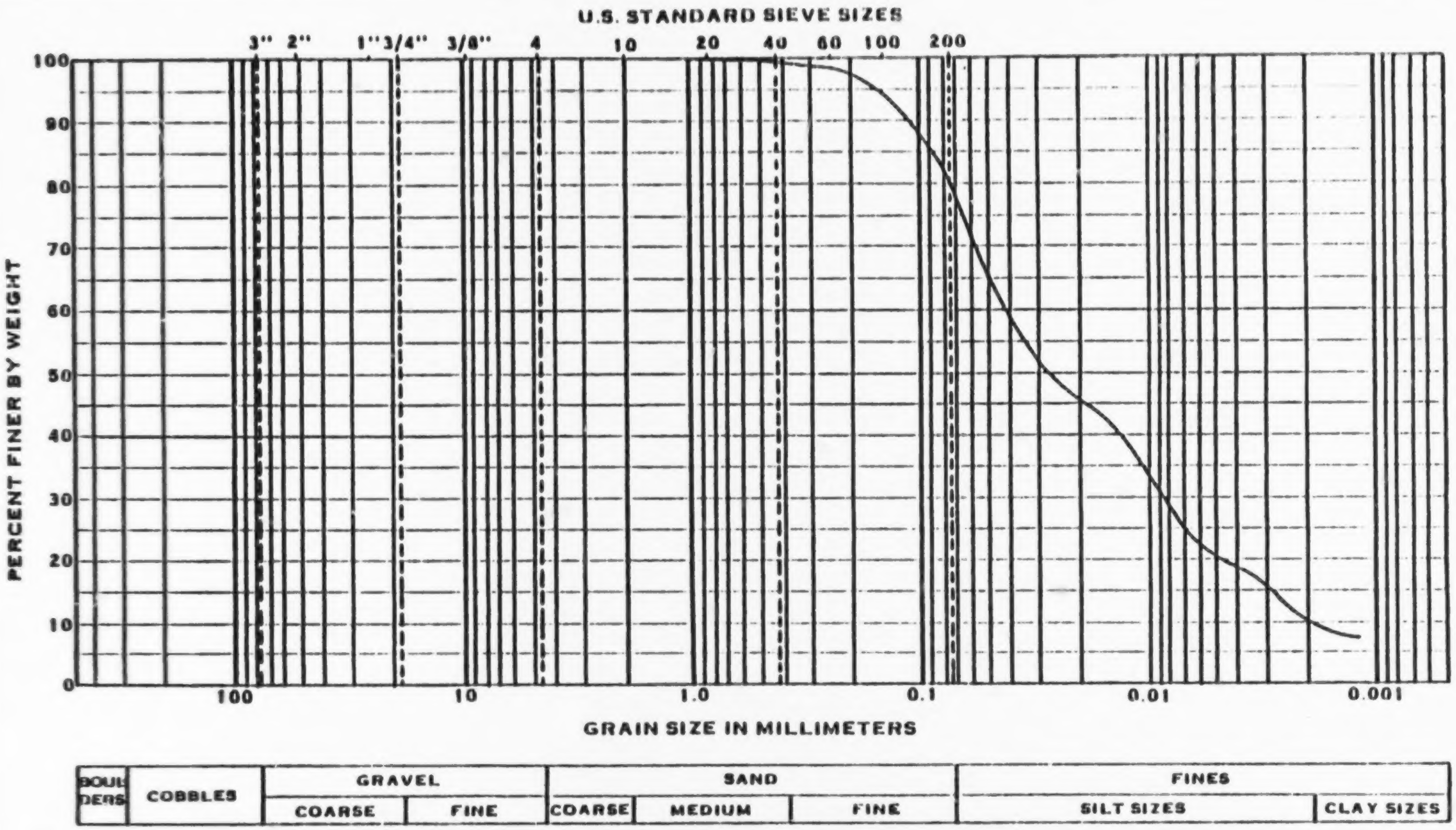
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.110



BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-230	150'				

PREPARED ________ DATE ____
REVISED ________ DATE ____
REVISED ________ DATE ____
APPROVED ________ DATE ____

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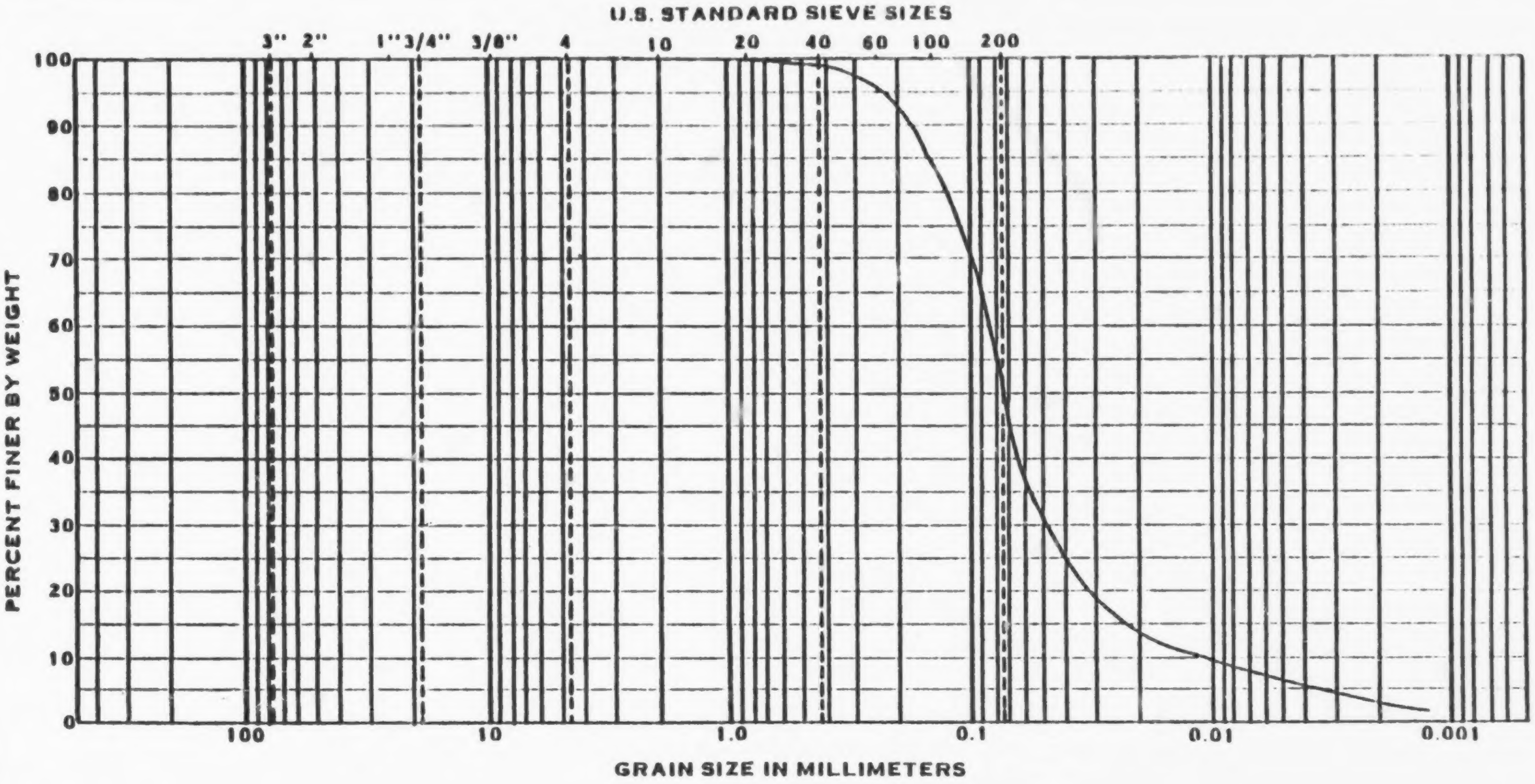
TABLE NO. B - 4.111



BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-230	160'				

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

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TABLE NO. B - 4.112

310

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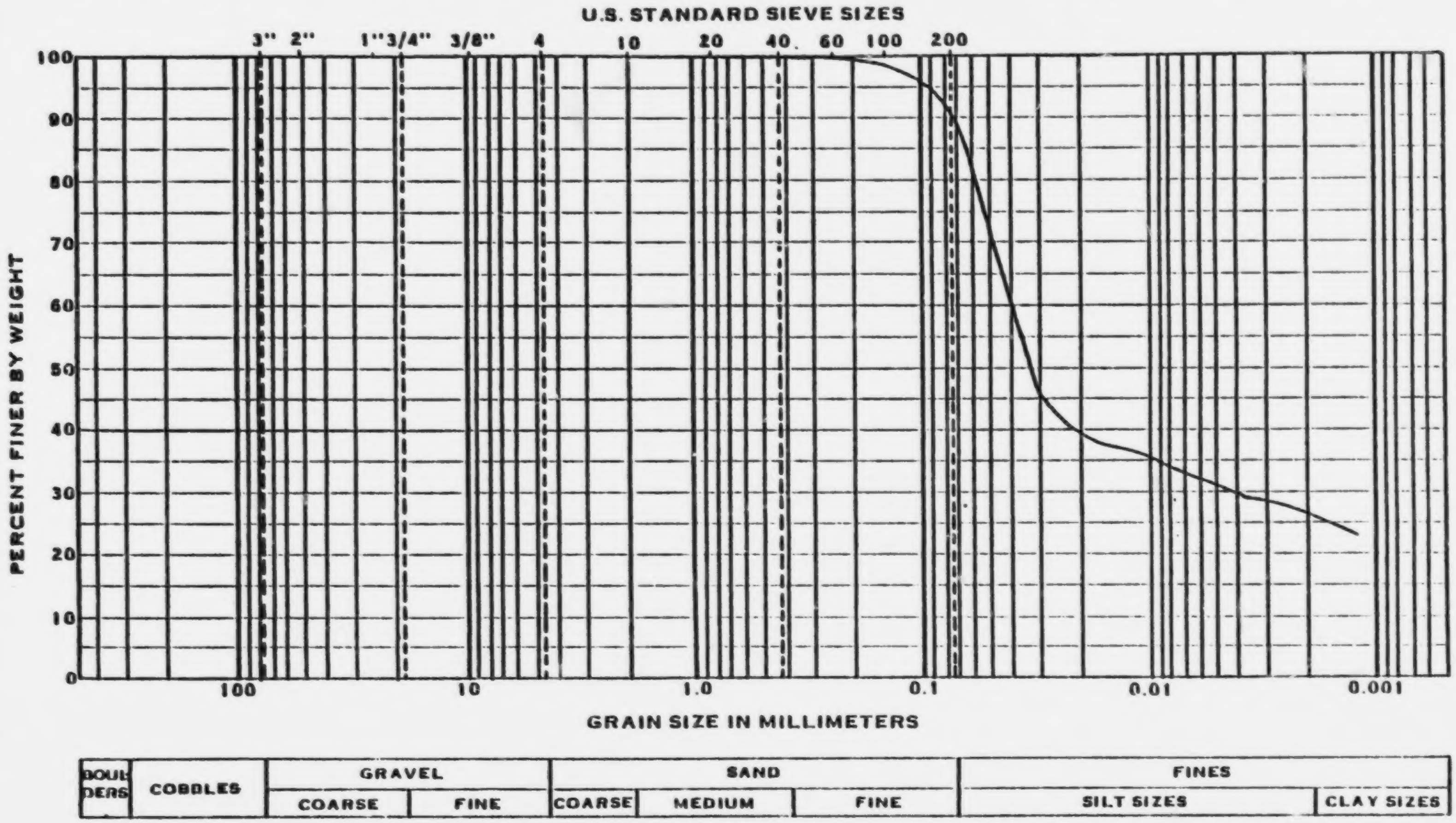

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI			
MRIG-301	39' - 40.5'					PREPARED ______ DATE ____ REVISED ______ DATE ____ REVISED ______ DATE ____ APPROVED ______ DATE ____	NATIONAL WASTE TERMINAL STORAGE PROGRAM GEOLOGIC EVALUATION GULF COAST SALT DOMES LAW ENGINEERING TESTING COMPANY MARIETTA GEORGIA	MISSISSIPPI STUDY AREA APPENDIX B-4 RICHTON DOME GRAIN SIZE DISTRIBUTION TABLE NO. B - 4.113

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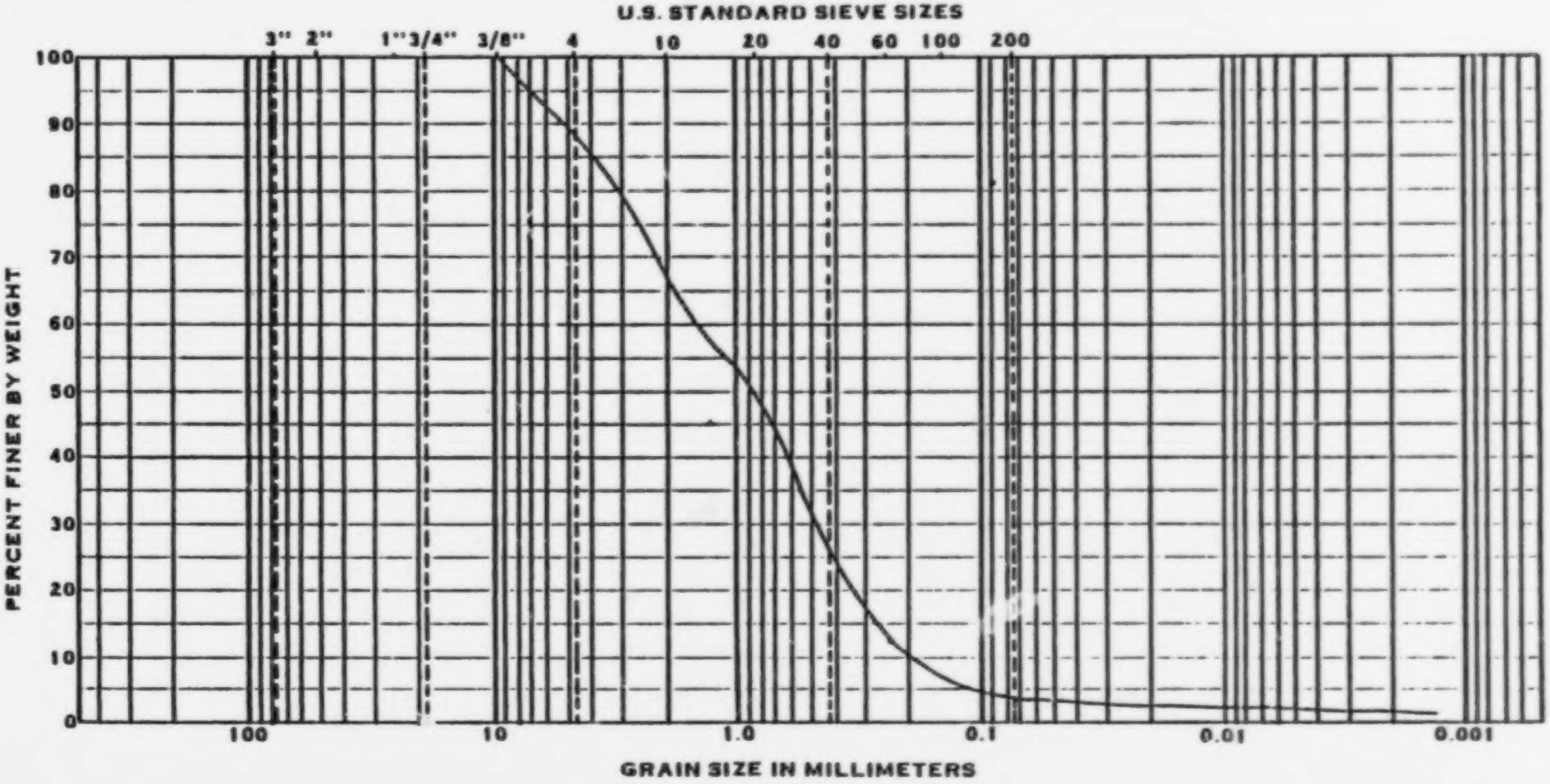

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG 301	99' - 100.5'				

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

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TABLE NO. B - 4.114

312

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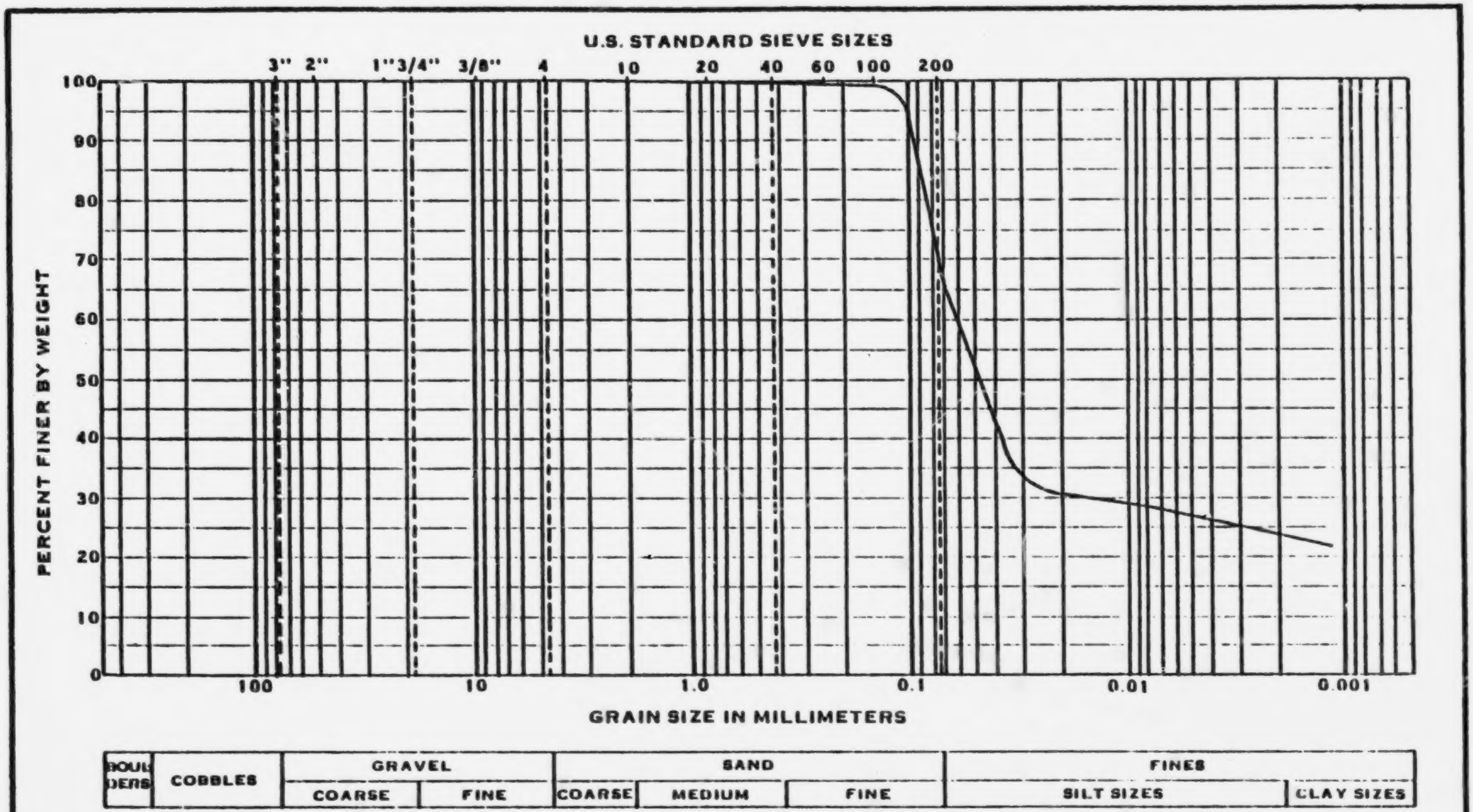

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-301	229' - 230.5'				

PREPARED ______ DATE ______
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

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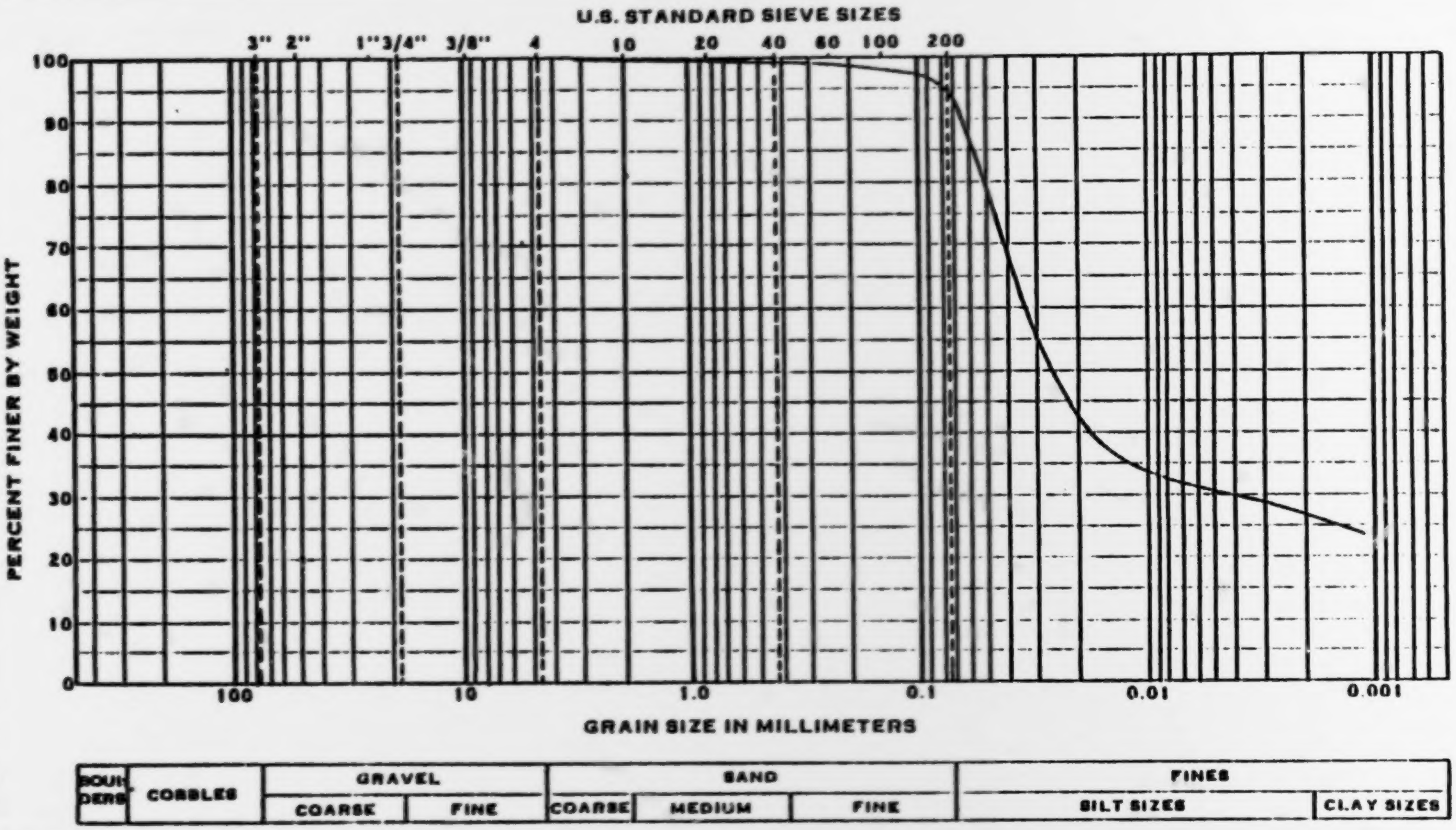
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4 115

313 BEST DOCUMENT AVAILABLE



BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-304	29 - 30.5'				

PREPARED ______ DATE ____
REVISED ______ DATE ____
REVISED ______ DATE ____
APPROVED ______ DATE ____

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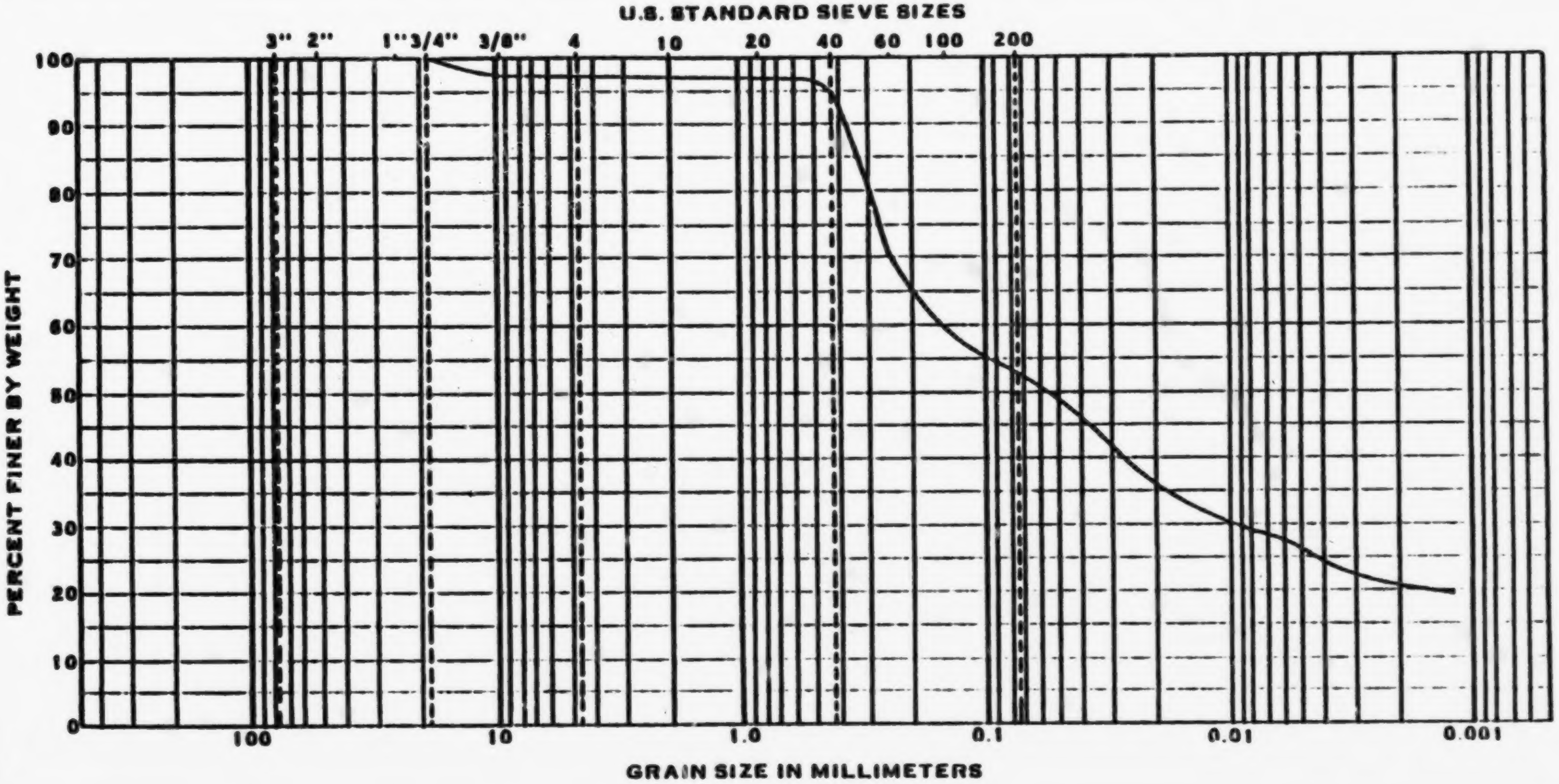
TABLE NO. B - 4.116



BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-305	179' - 180.5'				

PREPARED ________ DATE ____
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LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX B-4
RICHTON DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.117

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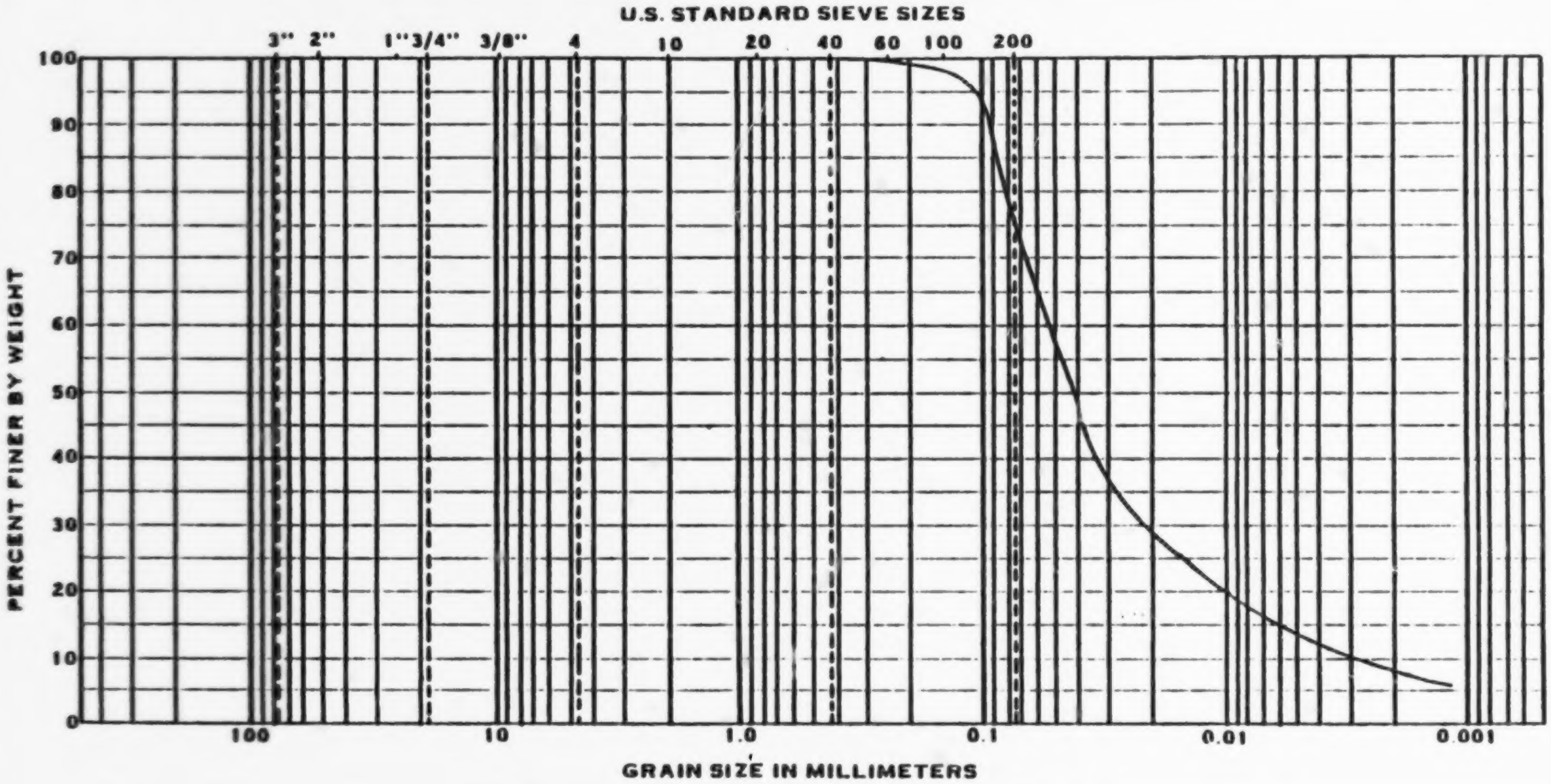

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-305	209' - 210.5'				

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APPROVED ________ DATE ____

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APPENDIX B-4
RICHTON DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.118

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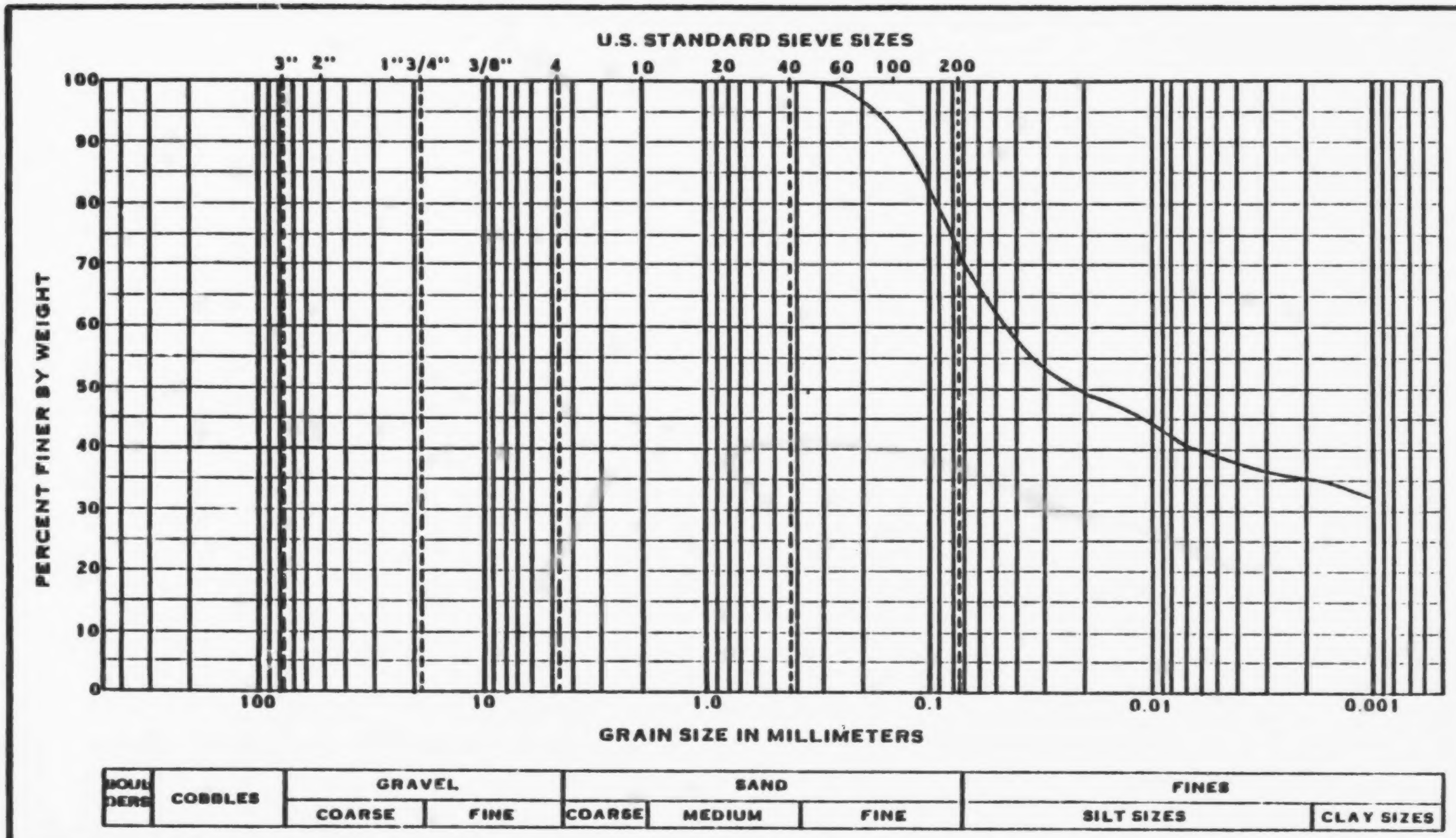

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-307	9' - 10.5'				

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APPROVED ________ DATE ____

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APPENDIX B-4
RICHTON DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.119

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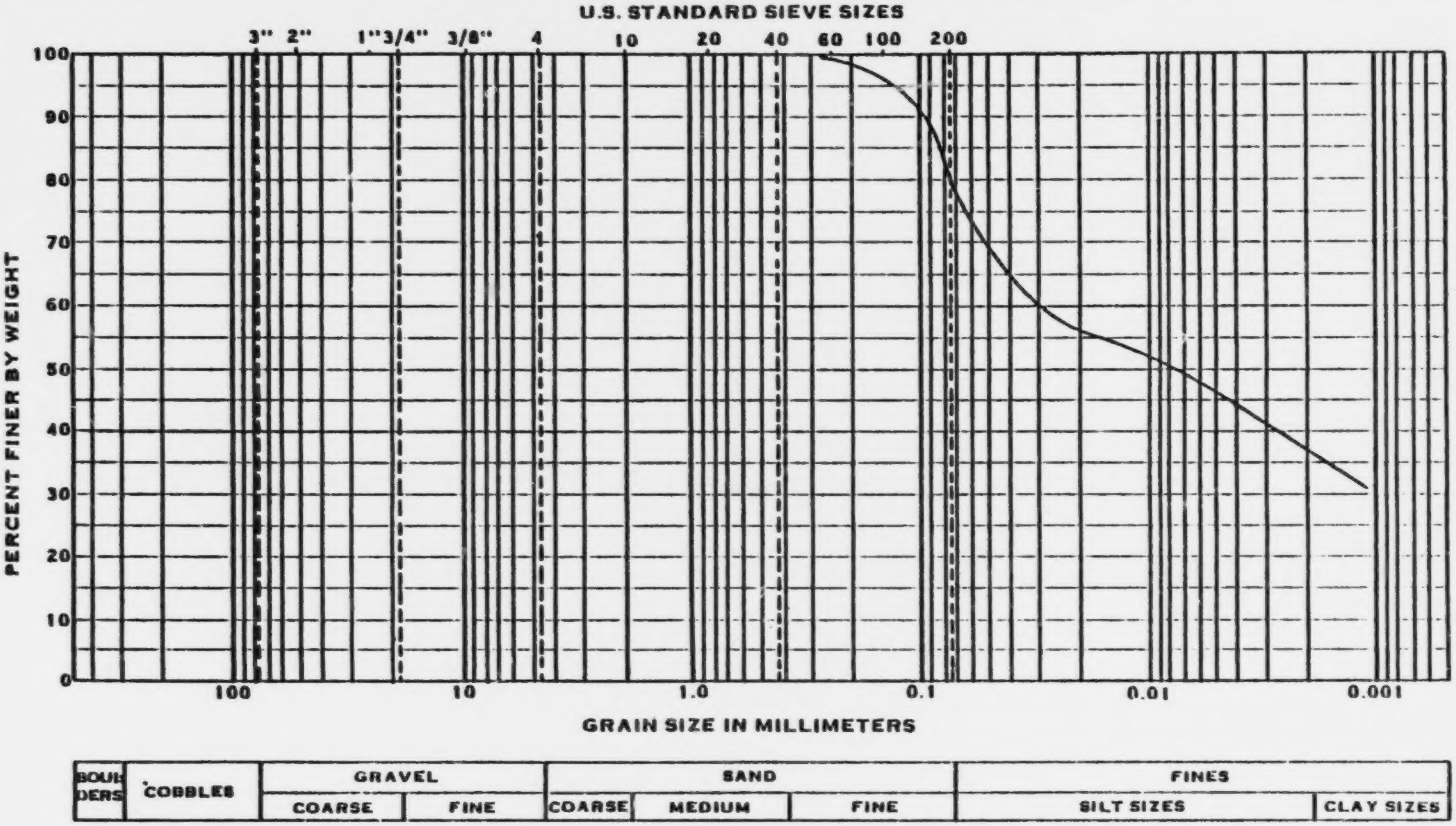

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-308	9' - 10.5'				

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REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

NATIONAL WASTE TERMINAL STORAGE PROGRAM
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RICHTON DOME
GRAIN SIZE DISTRIBUTION

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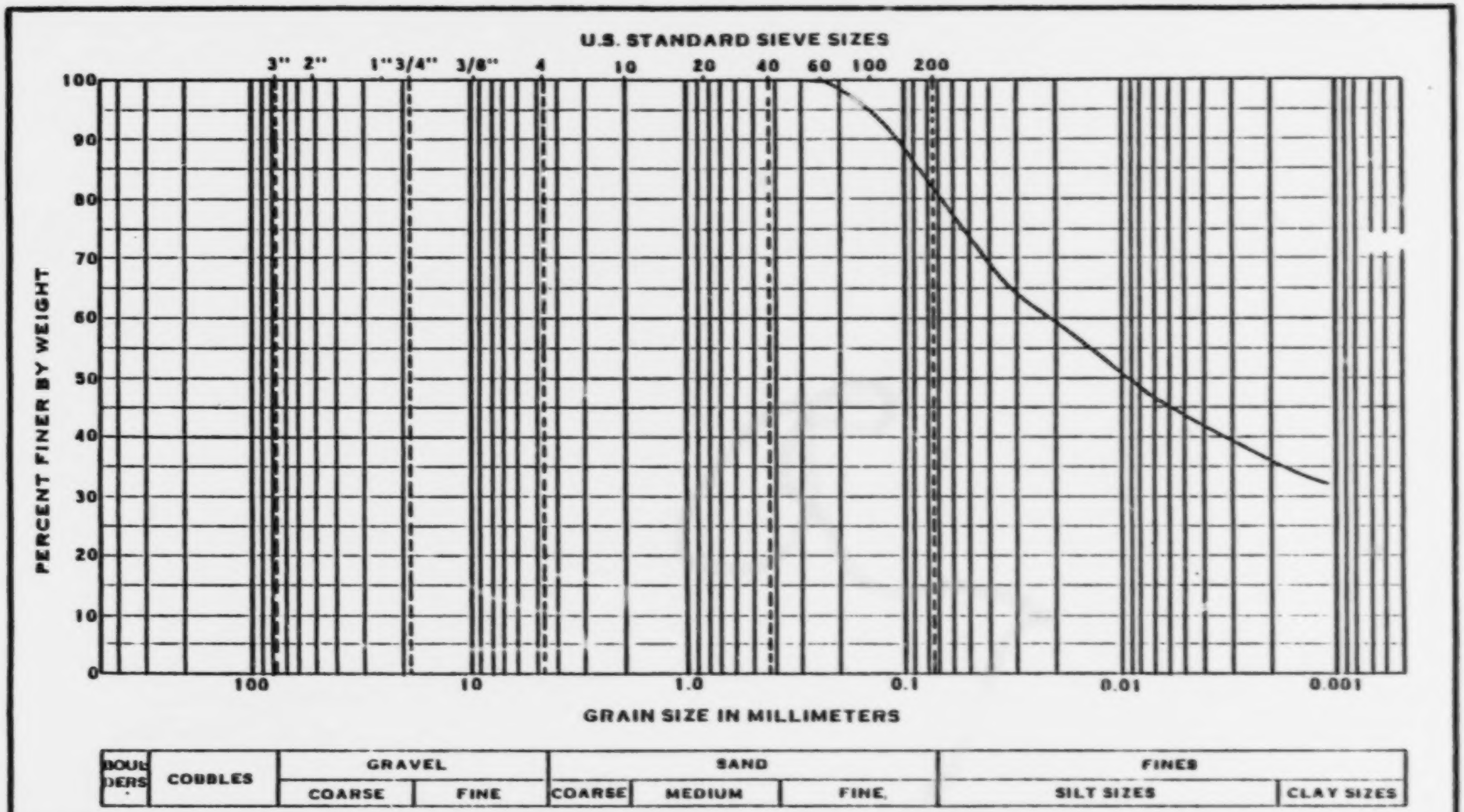

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-308	24' - 25.5'				

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REVISED ________ DATE ____
REVISED ________ DATE ____
APPROVED ________ DATE ____

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MISSISSIPPI STUDY AREA
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RICHTON DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.121

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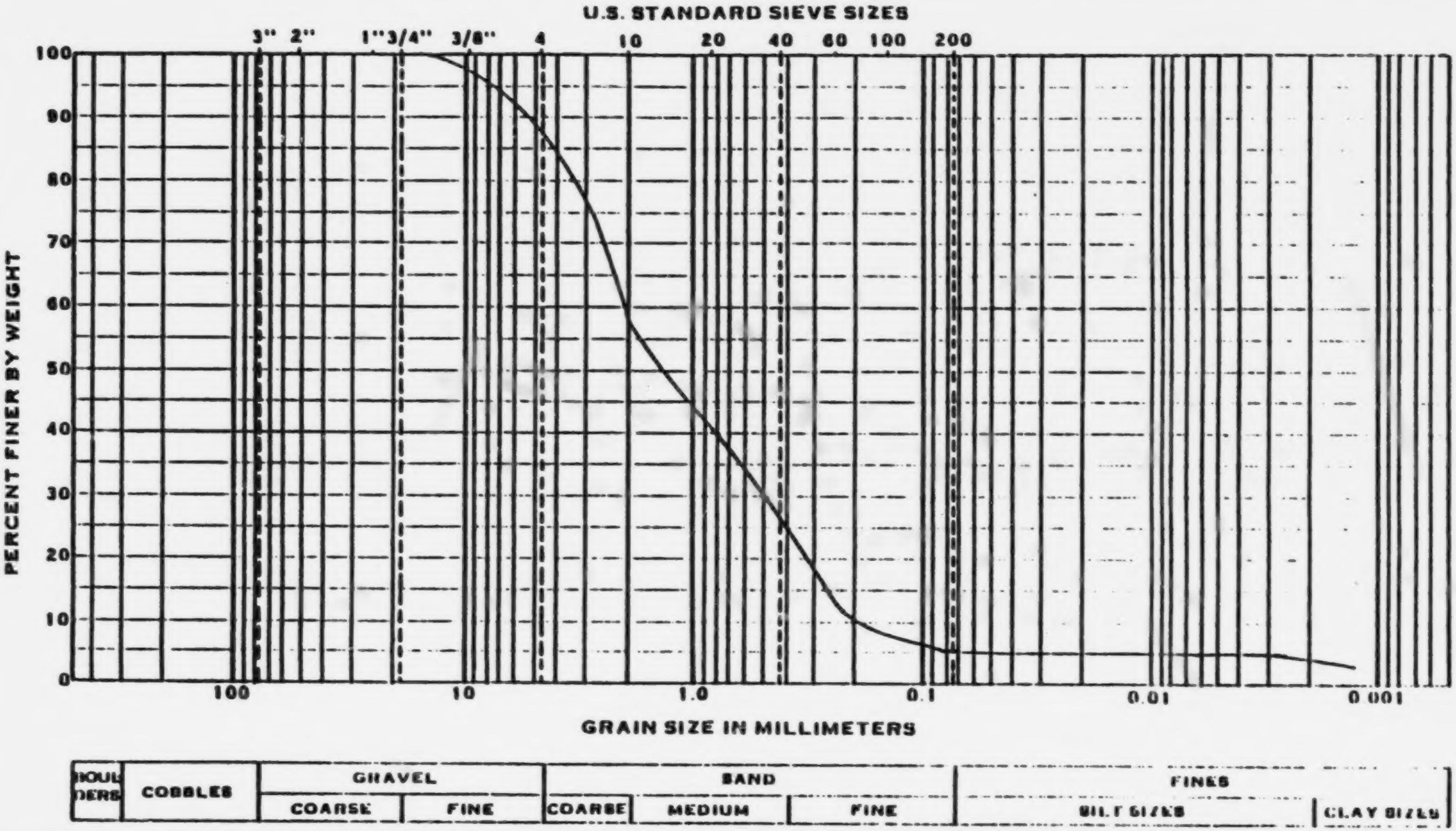

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-308	44' - 45.5'				

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REVISED ______ DATE ____
APPROVED ______ DATE ____

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MISSISSIPPI STUDY AREA
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GRAIN SIZE DISTRIBUTION

TABLE NO. B 4.122

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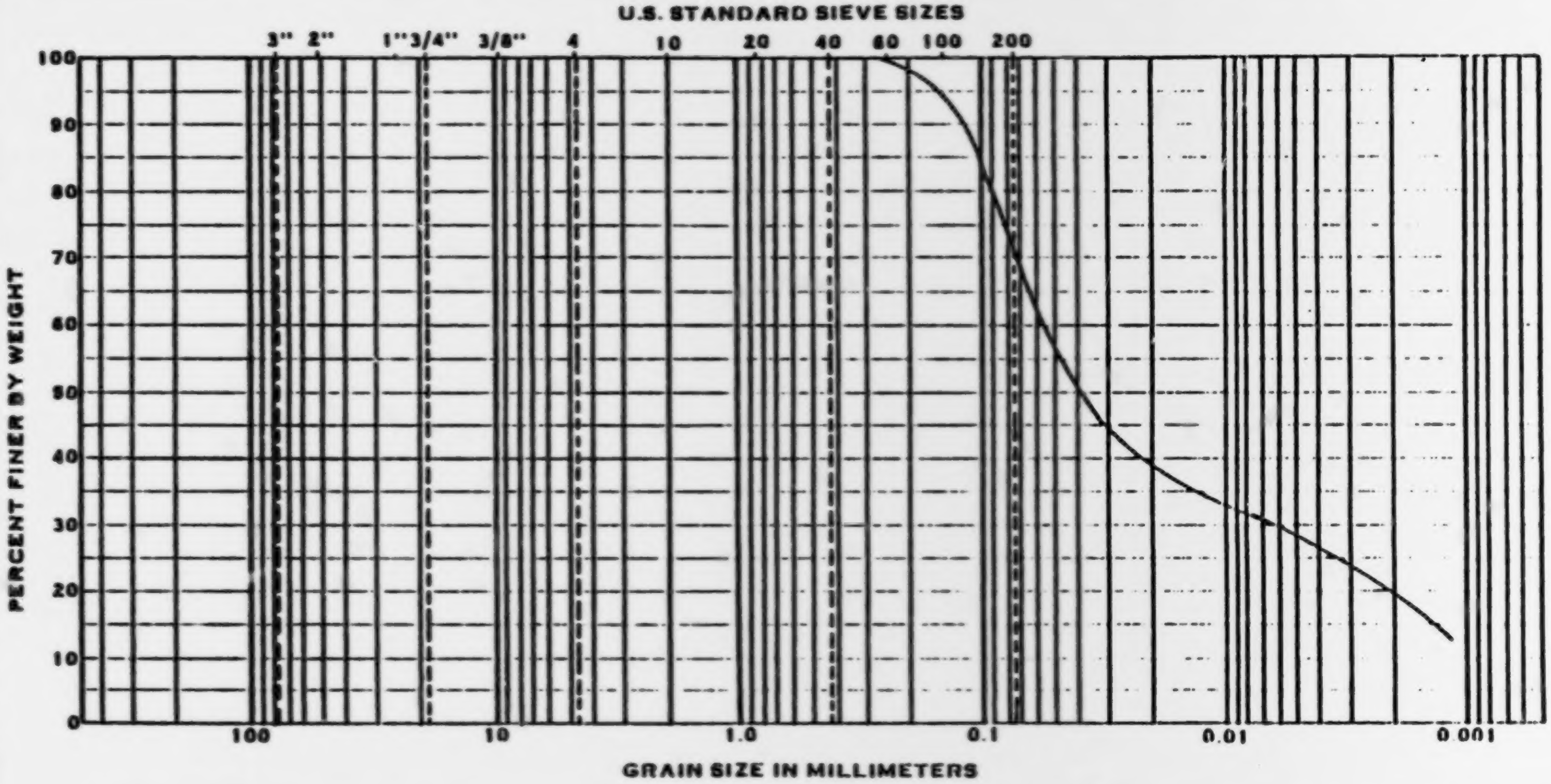

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-308	99 - 100.5'				

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REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED ______ DATE ______

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MISSISSIPPI STUDY AREA
APPENDIX B-4
RICHTON DOME
GRAIN SIZE DISTRIBUTION

TABLE NO. B - 4.123

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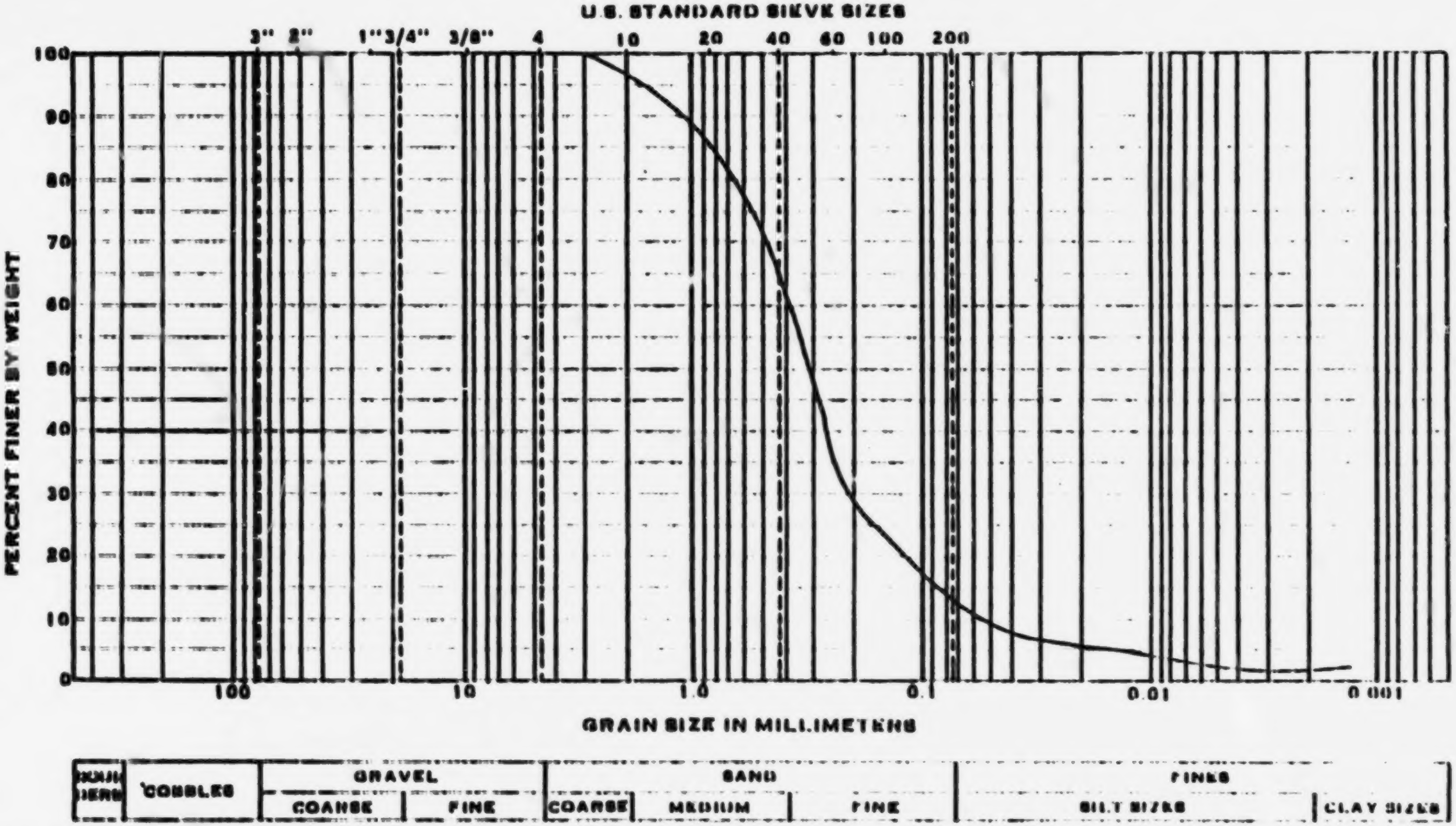

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI
MRIG-309	159' - 160.5'				

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REVISED . . . . . DATE . . .
APPROVED . . . . . DATE . . .

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STORAGE PROGRAM
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MISSISSIPPI STUDY AREA
APPENDIX B 4
RICHTON DOME
GRAIN SIZE DISTRIBUTION

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APPENDIX C

Ground Water

MISSISSIPPI STUDY AREA

APPENDIX C - GROUND WATER

C-1 Aquifer Field Test Methods
C-2 Water Level Monitoring
C-3 Water Sampling Techniques
C-4 Flood Plain Delineation

MISSISSIPPI STUDY AREA

APPENDIX C-1

AQUIFER FIELD TEST METHODS

The basic objective of ground-water studies in Mississippi was to determine the availability, occurrence, movement, and chemistry of ground water in the study area. Quantitative knowledge of aquifer characteristics such as storage, transmissivity, and hydraulic conductivity (see Glossary in Volume VI for definition of terms) provides the basis on which the occurrence and movement of ground water are defined. By combining these characteristics with water level, water chemistry, and lithologic data, a description of the ground-water flow system can be made.

Forty-one wells were drilled at eleven data-collection sites during the field investigations for Area Characterization in the Mississippi Study Area (Table C-1.1). Tests were run to determine aquifer characteristics at each site (Table C-1.2) (Tables 14-2 and 14-8 in Volume VI). All hydrogeologic data-collection sites were configured in a manner similar to that shown in Figure C-1.1. All wells were constructed similarly to that shown in Figure C-1.2.

Aquifer tests were performed in formations expected to have significant fluid-transmitting properties. Tests were performed by pumping a well at a constant rate for a specified time period and concurrently observing water level changes. Water levels also were monitored for a period of time after pumping stopped. The data from pumped wells were analyzed for transmissivity and hydraulic conductivity using the modified Theis nonequilibrium formula and Theis recovery formula (Ferris and others, 1962).

Flowing wells in the study area were not amenable to the type of aquifer-testing procedure outlined above. Jacob and Lohman (1952) derived equations for testing flowing wells when drawdown is held constant and discharge allowed to vary with time. Wells MH-4A, MH-7A, MH-8C, and MRIH-11B were analyzed using this technique.

Special techniques were used for testing the caprock-salt interface at Sites MCCG-1 and MRIG-9. A drill-stem test using a straddle-packer, similar to that employed in the petroleum industry, was used to test the caprock-salt interface at Site MCCG-1. Pressure buildup data were analyzed by methods outlined by Horner (1951). The data were used to estimate the hydraulic conductivity of the caprock at this site. A swabbing test, also involving a straddle-packer, was conducted on caprock-salt interface at Site MRIG-9. Water level recovery data were analyzed by utilizing a procedure developed by Cooper and others (1967). The data were used to calculate the hydraulic conductivity of the caprock at this site.

Prior to aquifer testing, all wells were developed to remove remnant drilling fluids from the formation around the borehole and any fine-grain material from around the well screen. Well development normally was completed after a period of from 12 to 24 hours. An initial-capacity step-drawdown test was then run to determine the discharge rates to be used for a 24-hour aquifer test.

Problems associated with aquifer testing and analyses were related to equipment malfunction and to the aquifer and water chemistry characteristics. In some tests, changing temperatures and salinities and the presence of gaseous hydrocarbons caused an inconsistent pattern of test results. In such cases, the values of the aquifer parameters derived from the tests have a level of uncertainty associated with them which is greater than normal. To reduce this uncertainty, the aquifer-test data used in the analysis were those obtained during periods when temperature, salinity and concentration of gas were stabilized. Results of the Law Engineering analyses are in accordance with regional trends of published data. This suggests that the assumptions are reasonable.

MISSISSIPPI STUDY AREA

APPENDIX C-1

TABLE C-1.1 (Page 1 of 3) BEST DOCUMENT AVAILABLE

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AQUIFER TEST WELL CONSTRUCTION SUMMARY

SITE ID	WELL	GROUND SURFACE ELEVATION FEET, MSL	CASING LENGTH FT	NOMINAL CASING DIAMETER IN	APPROXIMATE ELEVATION TOP OF SCREEN FEET, MSL	SCREEN LENGTH FT	NOMINAL SCREEN DIAMETER IN	GEOLOGIC UNIT SCREENED
MCCG-1	1	221.0	1247[1]	8	-1026[1] *	122 *	N/A *	*Open hole completed in Cypress Creek Salt Dome Caprock.
	1WS	219.9	55	4	165	20	4	Citronelle Formation
MCCG-2		196.9	2669	6	-2470	10	4	Kosciusko (Sparta) Formation
	2WS	196.5	206	4	-9	40	4	Upper Hattiesburg Formation
	3A	258.2	3062	6	-2810	30	4	Cockfield Formation

MCCH-3	3B	257.9	3450	6	-3189	40	4	Kosciusko (Sparta) Formation
	3C	258.3	1737	6	-1532	40	4	Catahoula Formation
	3D	257.7	1212	6	-961	30	4	Hattiesburg and Catahoula Formations (Undiff.)
	3WS	254.4	305	4	-51	40	4	Upper Hattiesburg Formation
MH-4	4A	183.3	2505	6	-2322	20	4	Upper Wilcox Group
	4B	183.1	1935	6	-1762	20	4	Kosciusko (Sparta) Formation
	4C	183.4	1697	6	-1514	20	4	Cook Mountain Formation
	4D	183.1	1090	6	-907	20	4	Catahoula Formation
	4WS	148.4	83	4	65	35	4	Citronelle Formation

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MISSISSIPPI STUDY AREA

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APPENDIX C-1

TABLE C-1.1 (Page 2 of 3)

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AQUIFER TEST WELL CONSTRUCTION SUMMARY

SITE ID	WELL	GROUND SURFACE ELEVATION FEET, MSL	CASING LENGTH FT	NOMINAL CASING DIAMETER IN	APPROXIMATE ELEVATION TOP OF SCREEN FEET, MSL	SCREEN LENGTH FT	NOMINAL SCREEN DIAMETER IN	GEOLOGIC UNIT SCREENED
MH-5	5A	315.8	2952	6	-3205	20	4	Middle Wilcox Group
	5B	315.8	2489	6	-2179	30	4	Kosciusko (Sparta) Formation
	5C	315.7	2244	6	-1928	40	4	Cook Mountain Formation
	5D	316.1	1500	6	-1184	40	4	Catahoula Formation
	5WS	315.3	163	4	152	20	4	Upper Hattiesburg Formation
	6A	444.6	3266	6	-2821	20	4	Upper Wilcox Group

MH-6	6B	446.1	2724	6	-2278	30	4	Kosciusko (Sparta) Formation
	[illegible]	445.0	2388	6	-1943	30	4	Cook Mountain Formation
	6D	446.2	1375	6	-929	20	4	Catahoula Formati
	6WS	445.9	295	4	151	30	4	Upper Hattiesburg Formation
MH-7	7A	210.4	2650	6	-2440	20	4	Upper Wilcox Group
	7B	208.8	1936	6	-1731	20	4	Kosciusko (Sparta) Formation
	7C	210.1	1615	6	-1415	30	4	Cook Mountain Formation
	7D	207.9	770	6	-562	30	4	Catahoula Formation
	7WS	203.9	335	4	-131	40	4	Upper Hattiesburg Formation

MISSISSIPPI STUDY AREA

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APPENDIX C-1

TABLE C-1.1 (Page 3 of 3)

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AQUIFER TEST WELL CONSTRUCTION SUMMARY

SITE ID	WELL	GROUND SURFACE ELEVATION FEET, MSL	CASING LENGTH FT	NOMINAL CASING DIAMETER IN.	APPROXIMATE ELEVATION TOP OF SCREEN FEET, MSL	SCREEN LENGTH FT	NOMINAL SCREEN DIAMETER IN	GEOLOGIC UNIT SCREENED
MH-8	8A	244.3	3180	6	-2936	10	4	Upper Wilcox Group
	8C	245.0	2455	6	-2226	40	4	Cook Mountain Formation
	8WS	247.3	219	4	28	60	4	Upper Hattiesburg Formation
MRIG-9	9	256.0	569[2]	8	-313	197*	N/A	*Open hole completed in Richton salt dome caprock
	9WS	256.2	367	4	-111	10	4	Upper Hattiesburg Formation
								Upper

								Hattiesburg Formation
MRIG-10	10	284.6	2614	6	-2329	20	4	Upper Wilcox Group
	10WS	282.6	280	4	3	10	4	Upper Hattiesburg Formation
MRIH-11	11A	180.4	4201	6	-4025	20	4	Lower Wilcox Group
	11B	184.1	2520	6	-2339	30	4	Upper Wilcox Group
	11C	181.7	1575	6	-1396	30	4	Cook Mountain Formation
	11D	183.3	905	6	-728	20	4	Catahoula Formation
	11WS	188.3	118	4	71	40	4	Upper Hattiesburg Formation

NOTES: 1. Casing length includes 1195 ft. of casing plus 52 ft. of cement grout below casing.

330A 2. Casing length includes 559 ft. of casing plus 10 ft. of cement grout below casing.

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MISSISSIPPI STUDY AREA
APPENDIX C-1
TABLE C-1.2
SUMMARY OF AQUIFER SYSTEM PROPERTIES IN THE MISSISSIPPI STUDY AREA

SITE ID	WELL	DATE OF TEST	AQUIFER SCREENED	DEPTH TO WATER PRIOR TO PUMPING (FT)	DEPTH TO WATER AT END OF TEST (FT)	PUMPING RATE (FT³/SEC)	MAXIMUM FLUID TEMPERATURE OF PUMP DISCHARGE (°C)	TRANSMISSIVITY (FT²/D)	HYDRAULIC CONDUCTIVITY (FT/D)	METHOD OF ANALYSIS (DATA FROM ANALYSIS OF WATER LEVELS IN PUMPED WELL UNLESS OTHERWISE NOTED)
MCCG -1	MCCG -1	OCT 1-2 1979	OPEN HOLE COMPLETED IN CYPRESS CREEK SALT DOME CAPROCK	124.13	221.36	0.023	32.8	14	1.4	THEIS MODIFIED NON EQUILIBRIUM
								3.6	0.36	JACOB RECOVERY
	MCCG -1	MAY 5 1979	CYPRESS CREEK SALT DOME CAPROCK INTERFACE					0.03	0.008	PRESSURE BUILD UP ANALYSIS BY HORNER'S METHOD
MCCG -2	MCCG -2	SEPT 26-27 1979	SPARTA FORMATION	94.94	238.70	0.169	30.0	290	29	THEIS MODIFIED NON-EQUILIBRIUM
								650	65	JACOB RECOVERY
	2WS	MAY 9-10 1979	UPPER HATTIESBURG FORMATION	106.38	117.94	0.132	21.5	690	17	THEIS MODIFIED NON-EQUILIBRIUM
								670	17	JACOB RECOVERY
MCCH -3	3A	OCT 5-6 1979	COCKFIELD FORMATION	303.66	470.55	0.002	29.0	0.72	0.02	THEIS MODIFIED NON EQUILIBRIUM
								0.5	0.02	JACOB RECOVERY
	3B	OCT 22-24 1979	SPARTA FORMATION	317.81	482.08	0.002	26.1	0.04	0.001	THEIS MODIFIED NON EQUILIBRIUM
										JACOB RECOVERY
	3C	OCT 7-8 1979	CATAHOULA FORMATION	254.83	398.83	0.109	30.0	360	9	THEIS MODIFIED NON-EQUILIBRIUM

MCCH -3	3C	OCT 7-8 1979	CATAHOULA FORMATION	254.83	398.83	0.109	30.0	360	9	NON-EQUILIBRIUM
								400	10	JACOB RECOVERY
	3D	JUNE 12-13 1979	HATTIESBURG/CATAHOULA FORMATIONS UNDIFF)	142.46	186.14	0.328	26.0	1300	43	THEIS MODIFIED NON EQUILIBRIUM
								1500	50	JACOB RECOVERY
	3WS	APR 9-10 1979	UPPER HATTIESBURG FORMATION	68.14	75.74	0.134	21.0	8500	200	THEIS MODIFIED NON EQUILIBRIUM
								9200	200	JACOB RECOVERY
MH-4	4A	AUG 14-15 1979	UPPER WILCOX GROUP	21.96	3.83	0.038	23.0	216	10.8	THEIS MODIFIED NON-EQUILIBRIUM
								211	10.5	JACOB RECOVERY
	4B	JAN 16-17 1980	SPARTA FORMATION	174.82	480.84	0.006	20.2	0.18	0.009	THEIS MODIFIED NON EQUILIBRIUM
								0.16	0.008	JACOB RECOVERY
	4C	AUG 22-23 1979	COOK MOUNTAIN FORMATION	36.75	337.68	0.014	25.5	0.96	0.05	THEIS MODIFIED NON EQUILIBRIUM
								0.70	0.03	JACOB RECOVERY
	4D	AUG 20-21 1979	CATAHOULA FORMATION	31.09	122.42	0.345	26.0	497	24.9	THEIS MODIFIED NON EQUILIBRIUM
								456	22.8	JACOB RECOVERY
	4WS	JUNE 6-7 1979	CITRONELLE FORMATION	50.28	65.94	0.059	20.5	1330	35	THEIS MODIFIED NON EQUILIBRIUM
								2118	56	JACOB RECOVERY
MH-5	5A	OCT 11-12 1979	MIDDLE WILCOX GROUP	143.26	379.06	0.108	40.5	26	1.30	THEIS MODIFIED NON-EQUILIBRIUM

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MISSISSIPPI STUDY AREA
APPENDIX C-1
TABLE C-1.2
SUMMARY OF AQUIFER SYSTEM PROPERTIES IN THE MISSISSIPPI STUDY AREA

SITE ID		DATE OF TEST	AQUIFER SCREEN	DEPTH TO WATER PRIOR TO PUMPING (FT)	DEPTH TO WATER AT END OF TEST (FT)	PUMPING RATE (FT³/SEC)	MAXIMUM FLUID TEMPERATURE DISCHARGE OF PUMP (°C)	TRANSMISSIVITY (FT²/D)	HYDRAULIC CONDUCTIVITY (FT/D)	METHOD OF ANALYSIS (DATA FROM ANALYSIS OF WATER LEVELS IN PUMPED WELL UNLESS OTHERWISE NOTED)
MH-5	5B	JAN 14-15 1980	SPARTA FORMATION	239.39	485.01	0.006	24.0	0.23	0.008	THEIS MODIFIED NON-EQUILIBRIUM
								0.25	0.008	JACOB RECOVERY
	5C	SEPT 4-5 1979	COOK MOUNTAIN FORMATION	47.58	179.54	0.009	26.1	6.2	0.2	THEIS MODIFIED NON-EQUILIBRIUM
								11.0	0.3	JACOB RECOVERY
	5D	OCT 24-25 1979	CATAHOULA FORMATION	180.88	337.50	0.011	30.8	7.8	0.2	THEIS MODIFIED NON-EQUILIBRIUM
								6.3	0.2	JACOB RECOVERY
	5WS	MAY 31-JUNE 1 1979	UPPER HATTIESBURG FORMATION	48.37	135.58	0.038	21.0	565	28	THEIS MODIFIED NON-EQUILIBRIUM
								487	24	JACOB RECOVERY
	6A	NOV 2-3 1979	TALLAHATTA FORMATION AND UPPER WILCOX GROUP	175.35	482.19	0.021	28.6	18	0.9	THEIS MODIFIED NON-EQUILIBRIUM
								8.1	0.4	HARRILL RECOVERY
	6B	NOV 1-2 1979	SPARTA FORMATION	233.39	340.30	0.046	30.7	400	13	JACOB RECOVERY

		1979								
MH-6	6C	JAN 8-9 1980	COOK MOUNTAIN FORMATION	235.63	354.27	0.004	19.5	0.33	0.011	THEIS MODIFIED NON-EQUILIBRIUM
								0.28	0.009	JACOB RECOVERY
	6D	JAN 6-7 1980	CATAHOULA FORMATION	249.44	273.47	0.100	25.0	1700	85	THEIS MODIFIED NON-EQUILIBRIUM
								1600	80	JACOB RECOVERY
MH-6	6WS	JULY 19-20 1979	UPPER HATTIES-BURG FORMATION	193.97	206.91	0.112	20.0	4600	150	THEIS MODIFIED NON-EQUILIBRIUM
								4400	150	JACOB RECOVERY
MH-7	7A	AUG 28-29 1970	UPPER WILCOX GROUP	63.69	23.50	0.085	36.5	585	29.2	JACOB RECOVERY
	7B	DEC 4-5 1979	SPARTA FORMATION	26.24	266.79	0.003	22.3	0.18	0.009	THEIS MODIFIED NON-EQUILIBRIUM
								0.22	0.011	JACOB RECOVERY
	7C	JAN 4-5 1980	COOK MOUNTAIN FORMATION	25.64	442.81	0.007	22.9	0.22	0.007	THEIS MODIFIED NON-EQUILIBRIUM
								0.19	0.006	JACOB RECOVERY
	7D	JAN 2-3 1980	CATAHOULA FORMATION	47.14	90.39	0.335	22.8	5300	177	THEIS MODIFIED NON-EQUILIBRIUM
								8150	272	JACOB RECOVERY
	7WS	JULY 16-17 1979	UPPER HATTIES-BURG FORMATION	66.23	76.70	0.141	21.5	5010	125	THEIS MODIFIED NON-EQUILIBRIUM
								20500	510	JACOB RECOVERY

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MISSISSIPPI STUDY AREA
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TABLE C-1.2
SUMMARY OF AQUIFER SYSTEM PROPERTIES IN THE MISSISSIPPI STUDY AREA

SITE ID	WELL	DATE OF TEST	AQUIFER SCREENED	DEPTH TO WATER PRIOR TO PUMPING (FT)	DEPTH TO WATER AT END OF TEST (FT)	PUMPING RATE (FT³/SEC)	MAXIMUM FLUID TEMPERATURE OF PUMP DISCHARGE (°C)	TRANSMISSIVITY (FT²/D)	HYDRAULIC CONDUCTIVITY (FT/D)	METHOD OF ANALYSIS (DATA FROM ANALYSIS OF WATER LEVELS IN PUMPED WELL UNLESS OTHERWISE NOTED)
MH-8	8A	DEC. 14-15 1979	UPPER WILCOX GROUP	51.79	432.99	0.100	38.3	122	12.2	THEIS MODIFIED NON-EQUILIBRIUM
								24	2.4	JACOB RECOVERY
	8C	FEB. 14-15 1980	COOK MOUNTAIN FORMATION	254.85	35.40	0.088	31.5	157	3.9	JACOB & LOHMAN (1962) FREE FLOWING WELL
								136	3.4	JACOB RECOVERY
	8WS	JAN. 24-25 1980	UPPER HATTIESBURG FORMATION	88.70	93.91	0.113		8910	149	THEIS MODIFIED NON-EQUILIBRIUM
								8700	145	JACOB RECOVERY
MRIG-9	MRIG-9	DEC. 7-8 1979	OPEN HOLE COMPLETED IN RICHTON SALT DOME CAOROCK	107.47	197.97	0.065	31.8	19	0.8	JACOB RECOVERY
	MRIG-9	DEC. 4 1979	RICHTON SALT DOME CAPROCK INTERFACE				28.3	3.7	0.5	COOPER RECOVERY ANALYSIS
	9WS	FEB. 2-3 1980	UPPER HATTIESBURG FORMATION	103.80	308.95	0.056		77	8	THEIS MODIFIED NON-EQUILIBRIUM
								21	2	JACOB RECOVERY
		NOV.	UPPER					280	14	THEIS MODIFIED NON-EQUILIBRIUM

MRIG -10	MRIG -10	NOV. 9-10 1979	UPPER WILCOX GROUP	30.60	164.75	0.086	40.7	280	14	THEIS MODIFIED NON-EQUILIBRIUM
								260	13	HARRILL STEP DRAWDOWN
	10WS	FEB. 6-7 1980	UPPER HATTIESBURG FORMATION	115.62	269.62	0.007	24.3	5.3	0.53	THEIS MODIFIED NON-EQUILIBRIUM
								8.5	0.85	JACOB RECOVERY
MRIH -11	11A	NOV. 15-16 1979	LOWER WILCOX GROUP	86.46	267.58	0.114	45.1	1800	90	JACOB RECOVERY
	11B	NOV. 19-20 1979	UPPER WILCOX GROUP	28.12	4.22	0.052	32.0	280	9.0	JACOB RECOVERY
	11C	NOV. 19-20 1979	COOK MOUNTAIN FORMATION	49.51	466.84	0.004	21.5	0.08	0.003	THEIS MODIFIED NON-EQUILIBRIUM
								0.08	0.003	THEIS RECOVERY
	11D	NOV. 28-29 1979	CATAHOULA FORMATION	23.65	129.48	0.112	24.9	71	3.6	THEIS MODIFIED NON-EQUILIBRIUM
								63.0	3.2	JACOB RECOVERY
	11WS	JULY 31-AUG.1 1979	UPPER HATTIESBURG FORMATION	76.29	81.49	0.137	20.0	36.000	900	JACOB RECOVERY

NOTE:

1. WATER LEVEL ABOVE MEASURING POINT.
2. GEOLOGIC UNITS INCLUDE 0.3M (1FT.) OF THE TALLAHATTA FORMATION AND 5.8M (19FT.) OF THE UPPER WILCOX GROUP.
3. AN OPEN HOLE STRADDLE-PACKER RECOVERY TEST WAS CONDUCTED ON THE SALT DOME-CAPROCK INTERFACE.
4. AN OPEN HOLE STRADDLE-PACKER SLUG TEST WAS CONDUCTED ON THE SALT DOME-CAPROCK INTERFACE.

BEST DOCUMENT AVAILABLE

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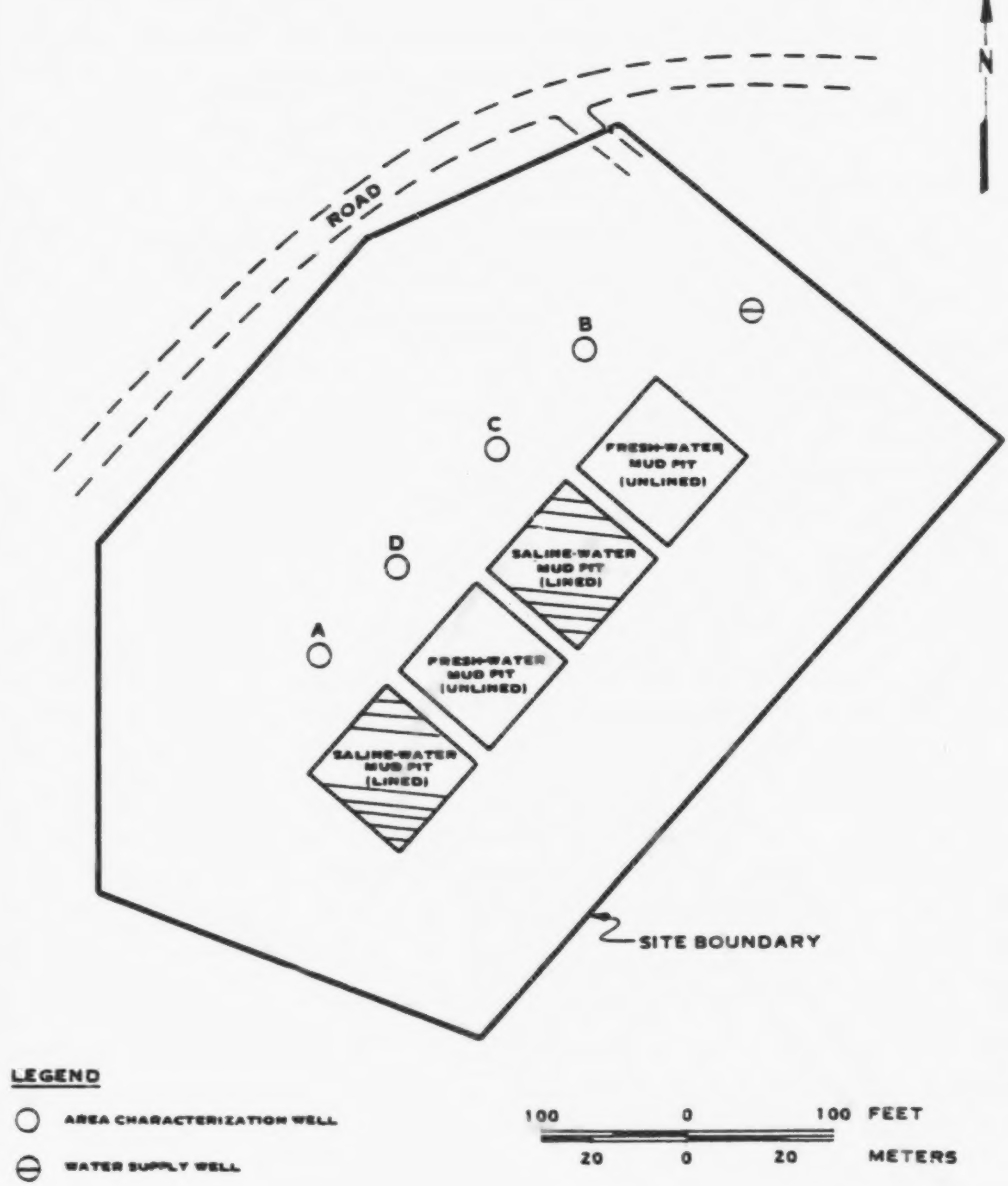
N
ROAD
B
C
D
A
FRESH-WATER MUD PIT (UNLINED)
SALINE-WATER MUD PIT (LINED)
FRESH-WATER MUD PIT (UNLINED)
SALINE-WATER MUD PIT (LINED)
SITE BOUNDARY
LEGEND
○ AREA CHARACTERIZATION WELL
⊖ WATER SUPPLY WELL
100 0 100 FEET
20 0 20 METERS

PREPARED ______ DATE ____
REVISED ______ DATE ____
REVISED ______ DATE ____
APPROVED ______ DATE ____
T-1185-1

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX C-1
TYPICAL DRILLING SITE LAYOUT

JOB NO. MV9700 FIGURE C-1.1

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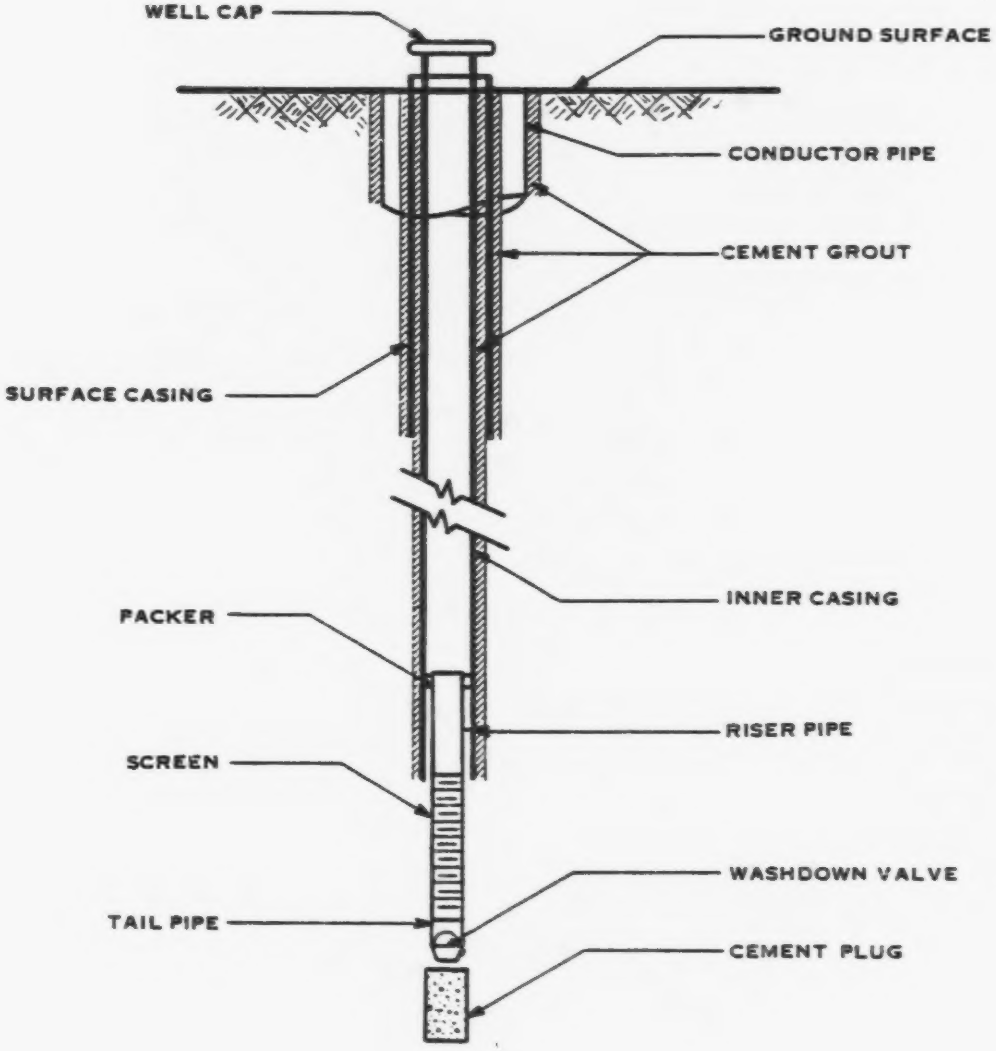
WELL CAP
GROUND SURFACE
CONDUCTOR PIPE
CEMENT GROUT
SURFACE CASING
INNER CASING
PACKER
RISER PIPE
SCREEN
WASHDOWN VALVE
TAIL PIPE
CEMENT PLUG

NOT TO SCALE

PREPARED ____ DATE ____
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REVISED ____ DATE ____
APPROVED ____ DATE ____
T-1156-1

NATIONAL WASTE TERMINAL
STORAGE PROGRAM
GEOLOGIC EVALUATION GULF
COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX C-1
TYPICAL WELL CONSTRUCTION

JOB NO. MV9700 FIGURE C-1.2

APPENDIX C-1

REFERENCES

Cooper, H. H., Jr.; Bredehoeft, J. D.; and Papadopulos, I. S.; 1967, Response of a finite-diameter well to an instantaneous charge of water: Water Resources Research, V. 3, No. 1, p. 263-269.

Ferris, J. G.; Knowles, D. B.; Brown, R.H.; and Stallman, R. W.; 1962, Theory of aquifer tests: U.S. Geological Survey Water-Supply Paper 1536-E, 174 p.

Horner, D. R., 1951, Pressure build-up in wells: Proceedings of the Third World Petroleum Congress, section II, pp. 503-523.

Jacob, C. E.; and Lohman, S.W.; 1952, Nonsteady flow to a well of constant drawdown in an extensive aquifer: American Geophys. Union Trans., V. 33, No. 4, p. 559-569.

Lohman, S. W., 1972, Ground-Water Hydraulics: U.S. Geological Survey Professional Pepr 708, 70 p.

MISSISSIPPI STUDY AREA

APPENDIX C-2

WATER LEVEL MONITORING

Long-term water level readings are used to determine the response of the ground-water reservoir to recharge and discharge.

Water levels were measured periodically by Law Engineering personnel using a calibrated steel-tape. In some instances, hourly water-level measurements were recorded using Leopold & Stevens Digital Water Level Recorders. Tables C-2.1 through C-2.16 give basic data about each Area Characterization well and the measured elevation of the water level referenced to mean sea level.

MISSISSIPPI STUDY AREA

TABLE C-2.1

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE USA MCCG-1

WATER LEVEL MEASURED --- Uncased core hole in Cypress Creek Dome Caprock (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 8-in.* steel casing, 3.2 ft.** above ground surface. Ground surface is 221.0 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
10/29/79	106.2	2/01/80	106.7	6/25/80	106.6
11/15/79	106.4	2/29/80	106.5	8/02/80	106.3
11/29/79	106.7	4/01/80	106.7	8/25/80	104.7
12/14/79	106.2	4/29/80	106.9	9/26/80	105.7
12/31/79	106.8			11/05/80	105.8
				12/04/80	105.8
				3/12/81	105.6
				6/10/81	105.4
				7/21/81	105.3
				9/09/81	105.0

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.2

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE USA MCCG-2WS

WATER LEVEL MEASURED --- Screened in Hattiesburg Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details.

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 4-in.* steel casing, 2.2 ft.** above ground surface. Ground surface is 196.5 ft. MSL.

WATER LEVEL ELVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
7/19/79	87.6	10/29/79	86.6	3/29/80	90.0
9/24/79	87.7	11/15/79	86.7	4/29/80	92.1
9/25/79	87.8	12/14/79	87.8	6/24/80	88.8
9/29/79	88.0	12/31/79	88.0	8/02/80	87.5
9/30/79	88.1	2/01/80	89.3	8/25/80	86.5
10/20/79	86.8	2/29/80	89.7	9/26/80	85.3
				11/05/80	85.8
				12/04/80	86.2
				3/11/81	87.1
				6/09/81	85.9
				7/21/81	85.3
				9/09/81	84.9

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

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MISSISSIPPI STUDY AREA

TABLE C-2.3

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE USA MCCG-2

WATER LEVEL MEASURED --- Screened in Kosciusko (Sparta) Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 6-in.* steel casing 2.0 ft.** above ground surface. Ground surface is 196.9 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
9/20/79	99.8	11/15/79	101.9	3/29/80	102.4
9/23/79	101.8	11/29/79	101.8	4/29/80	103.1
9/24/79	102.0	12/14/79	101.8	6/24/80	102.6
9/29/79	101.4	12/31/79	101.8	8/02/80	102.6
9/30/79	101.5	2/01/80	102.4	8/25/80	102.4
10/02/79	101.5	2/29/80	102.2	9/26/80	104.3
10/29/79	101.9			11/05/80	102.7
				12/04/80	102.8
				3/11/81	103.5
				6/10/81	102.9
				7/21/81	102.9
				9/09/81	102.9
				11/11/81	102.8

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

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MISSISSIPPI STUDY AREA

TABLE C-2.4

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE USA MCCH-3WS

WATER LEVEL MEASURED --- Screened in Hattiesburg Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 4-in.* steel cashing, 1.1 ft.** above ground surface. Ground surface is 254.4 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
6/16/79	183.7	11/15/79	184.3	4/30/80	184.9
7/15/79	183.8	12/02/79	184.2	5/29/80	184.9
8/15/79	184.1	12/14/79	184.4	6/24/80	184.7
9/17/79	183.7	12/31/79	184.3	8/04/80	184.5
9/30/79	184.3	1/30/80	184.5	9/03/80	184.3
10/20/79	184.0	2/29/80	184.5	9/26/80	184.1
10/29/79	184.1	4/01/80	184.6	11/04/80	183.9
				12/03/80	183.9
				3/03/81	183.8
				6/10/81	183.6
				7/21/81	183.3
				9/09/81	183.1
				11/11/81	182.7

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.5

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE USA MCCH-3A

WATER LEVEL MEASURED --- Screened in Cockfield Formation (See Figure A-4.1 and Table C-1.1 for well location and well construtions details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 8-in.* steel casing, 0.8 ft.** above ground surface. Ground surface is 258.2 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
10/20/79	-48.1	12/31/79	-45.2	5/29/80	-46.3
10/29/79	-47.3	1/30/80	-47.4	6/24/80	-46.4
11/16/79	-49.7	2/29/80	-47.3	8/04/80	-46.4
11/29/79	-47.6	4/01/80	-47.3	9/03/80	-46.5
12/14/80	-45.7	4/30/80	-46.3	9/26/80	-47.4
				11/04/80	-46.4
				12/03/80	-46.5
				3/03/81	-46.6
				6/10/81	-46.6
				7/21/81	-46.7
				9/10/81	-47.8

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.6

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE USA MCCH-3B

WATER LEVEL MEASURED --- Screened in Kosciusko (Sparta) Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 6-in.* steel casing, 1.0 ft.** above ground surface. Ground surface is 258.1 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
12/14/79	-55.4	4/01/80	-51.2	8/04/80	-49.3
12/31/79	-54.4	4/30/80	-50.4	9/03/80	-49.4
1/30/80	-54.2	5/29/80	-49.9	9/26/80	-50.2
2/29/80	-52.8	6/24/80	-49.9	11/04/80	-48.8
				12/03/80	-48.6
				3/03/81	-48.1
				6/10/81	-48.5
				7/21/81	-48.4
				9/09/81	-47.5

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

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MISSISSIPPI STUDY AREA

TABLE C-2.7

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE USA MCCH-3C

WATER LEVEL MEASURED --- Screened in Catahoula Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 6-in.* steel casing, 0.7 ft.** above ground surface. Ground surface is 257.6 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
11/15/79	3.0	2/29/80	6.6	6/24/80	9.0
11/29/79	3.7	4/01/80	7.4	8/04/80	9.5
12/14/79	4.1	4/30/80	8.4	9/03/80	9.6
12/31/79	5.4	5/29/80	8.4	9/26/80	9.0
1/30/80	5.3			11/04/80	9.8
				12/03/80	10.2
				3/03/81	9.7
				6/10/81	10.5
				7/21/81	10.3
				9/10/81	10.2

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*To convert inches to millimeters, multiply by 25.4.

**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.8

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE USA MCCH-3D

WATER LEVEL MEASURED --- Screened in Hattiesburg-Catahoula Formation (undifferentiated) (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 6-in.* steel casing, 2.0 ft.** above ground surface. Ground surface is 257.7 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
6/16/79	117.8	9/15/79	117.6	2/29/80	117.6
6/17/79	117.2	9/23/79	117.7	4/01/80	117.7
6/18/79	117.1	9/30/79	117.8	4/30/80	117.8
6/19/79	117.5	10/20/79	117.4	5/29/80	117.7
7/15/79	117.6	10/29/79	117.4	6/24/80	117.2
7/21/79	117.5	12/02/79	117.4	8/04/80	117.2
8/15/79	117.6	12/14/79	117.7	9/03/80	116.8
9/06/79	116.9	12/31/79	117.6	9/26/80	116.3
9/11/79	117.5	1/30/80	117.7	11/04/81	116.6
				12/03/81	116.6
				3/03/81	116.4
				6/10/81	116.0
				7/21/81	114.6
				9/09/81	115.7

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.9

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE ROWELL MH-4WS

WATER LEVEL MEASURED --- Screened in Citronelle Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 4-in.* steel casing, 1.2 ft.** above ground surface. Ground surface is 148.4 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
5/15/79	98.1	10/20/79	97.8	4/29/80	99.0
6/15/79	97.9	10/29/79	97.8	5/29/80	99.1
8/15/79	94.7	11/29/79	97.9	6/25/80	98.6
8/20/79	97.8	12/31/79	97.9	8/04/80	98.6
9/17/79	97.8	2/01/80	98.0	9/03/80	98.2
9/30/79	98.0	2/29/80	98.2	9/26/80	97.8
10/15/79	97.7	4/02/80	99.7	11/04/80	97.6
				3/09/81	97.1

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.10

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE ROWELL MH-4A

WATER LEVEL MEASURED --- Screened in Upper Wilcox Group (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic pressure-gauge measurements. Measuring point: center line of 1/4-in.* tap into 6 in. steel casing, 0.7 ft.** above ground surface. Ground surface is 183.3 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
8/21/79	205.7	11/15/79	207.1	4/30/80	205.7
9/25/79	206.9	11/29/79	210.8	5/29/80	206.3
9/30/79	206.9	12/31/79	202.0	6/25/80	206.4
10/15/79	207.1	2/01/80	208.8	8/04/80	206.2
10/20/79	209.2	2/29/80	208.8	9/03/80	206.2
10/29/79	206.6	4/02/80	206.2	9/26/80	206.0
				11/04/80	206.0
				12/04/80	206.0
				3/09/81	209.5
				6/09/81	205.9
				7/22/81	207.1
				9/09/81	207.5

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.11

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE ROWELL MH-4B

WATER LEVEL MEASURED --- Screened in Kosciusko (Sparta) Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic pressure-gauge measurements. Measuring point: center line of 1/4-in.* tap into 8 in. valve, 2.8 ft.** above ground surface. Prior to 7/14/80 periodic electric-sounding measurements were made. Measuring point: top of 8 in. steel cashing, 1.5 ft. above ground surface. Ground surface is 183.4 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
4/02/80	118.9	6/25/80	173.4	9/03/80	202.5
4/29/80	142.0	8/04/80	200.4	9/26/80	198.5
5/29/80	161.0			11/04/80	200.4
				12/04/80	199.2
				3/09/81	200.1

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.12

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE ROWELL MH-4C

WATER LEVEL MEASURED --- Screened in Cook Mountain Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic pressure-gauge measurements. Measuring point: center line of 1/4-in.* tap into 8 in. steel casing, 1.4 ft.** above ground surface. Ground surface is 183.1 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
9/25/79	224.5	11/29/79	228.2	5/29/80	226.1
9/30/80	224.5	12/14/79	213.9	6/25/80	222.6
10/15/79	224.0	12/31/79	218.3	8/04/80	223.8
10/20/79	225.0	2/08/80	223.8	9/03/80	219.2
10/29/79	224.5	4/02/80	226.1	9/26/80	215.7
11/15/79	224.0	4/30/80	223.8	11/04/80	216.2
				12/04/80	223.8
				3/09/81	223.8
				6/09/81	219.2
				7/22/81	212.2
				9/09/81	216.1

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.13

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE ROWELL MH-4D

WATER LEVEL MEASURED --- Screened in Catahoula Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 6-in.* steel casing. 1.0 ft.** above ground surface. Ground surface is 183.1 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
8/08/79	151.7	10/29/79	152.0	4/02/80	152.9
8/09/79	152.2	11/15/79	152.1	5/29/80	152.1
8/14/79	152.3	12/02/79	152.2	6/25/80	156.6
8/15/79	151.1	12/14/79	152.3	8/04/80	156.2
9/16/79	151.9	12/31/79	152.3	9/03/80	151.0
9/30/79	152.1	2/01/80	152.2	9/26/80	150.8
10/20/79	151.9	2/29/80	151.7	11/04/80	150.8
				12/04/80	150.8
				3/09/81	150.8
				6/09/81	150.4
				7/22/81	150.2
				9/09/81	149.9
				11/11/81	149.5

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

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MISSISSIPPI STUDY AREA

TABLE C-2.14

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE USA MH-5WS

WATER LEVEL MEASURED --- Screened in Hattiesburg Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 4-in.* steel casing, 0.9 ft.** above ground surface. Ground surface is 315.3 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
8/13/79	265.4	11/16/79	264.4	4/28/80	270.1
8/15/79	265.5	12/02/79	264.2	5/28/80	271.9
9/17/79	265.9	12/14/79	263.8	6/27/80	271.5
9/23/79	267.5	12/31/79	264.5	8/04/80	270.3
9/30/79	264.9	1/30/80	264.9	9/03/80	268.8
10/20/79	264.9	2/29/80	265.5	9/26/80	267.7
10/29/79	264.9	4/01/80	265.7	11/04/80	266.0
				12/02/80	264.9
				3/03/81	263.1
				6/08/81	262.2
				7/22/81	261.4
				9/08/81	260.5
				11/11/81	259.2

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.15

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE USA MH-5A

WATER LEVEL MEASURED --- Screened in Middle Wilcox Group (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 6-in.* steel casing, 2.0 ft.** above ground surface. Ground surface is 315.8 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
10/20/79	183.0	2/29/80	183.9	6/27/80	183.8
10/29/79	183.1	4/01/80	184.1	8/04/80	184.0
12/14/79	183.0	4/28/80	184.2	9/03/80	183.4
12/31/79	183.7	5/28/80	184.2	9/26/80	183.5
1/30/80	183.4			11/04/80	183.6
				12/02/80	184.0
				3/03/81	184.5
				6/08/81	184.5
				7/22/81	184.5
				9/08/81	184.4
				11/11/81	184.4

T-1658-1

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.16

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE USA MH-5B

WATER LEVEL MEASURED --- Screened in Kosciusko (Sparta) Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 6-in.* steel casing, 1.2 ft.** above ground surface. Ground surface is 315.8 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
4/01/80	106.7	5/28/80	151.8	9/03/80	178.7
4/02/80	133.7	6/27/80	167.4	9/26/80	181.6
4/28/80	134.6	8/04/80	173.8	11/04/81	184.9
				12/02/81	186.7
				3/03/81	190.3
				6/08/81	192.5
				7/22/81	193.1
				9/08/81	193.5
				11/11/81	193.9

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.17

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE USA MH-5C

WATER LEVEL MEASURED --- Screened in Cook Mountain Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 6-in.* steel casing, 1.3 ft.** above ground surface. Ground surface is 315.7 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
9/10/79	254.8	11/29/79	257.2	4/28/80	261.4
9/11/79	254.9	12/14/79	257.8	5/28/80	261.8
9/15/79	255.2	12/31/79	258.2	6/27/80	262.8
9/23/79	255.5	1/30/80	259.0	8/04/80	263.7
9/30/79	255.9	2/29/80	259.7	9/03/80	264.4
10/20/79	256.3	4/01/80	260.5	9/26/80	265.0
11/16/79	261.9			11/04/80	266.2
				12/02/80	266.8
				3/03/81	269.1
				6/08/81	272.7
				7/22/81	273.7
				9/08/81	274.8
				11/11/81	276.0

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

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MISSISSIPPI STUDY AREA

TABLE C-2.18

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE USA MH-5D

WATER LEVEL MEASURED --- Screened in Catahoula Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 6-in.* steel casing, 0.9 ft.** above ground surface. Ground surface is 316.1 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
7/12/79	135.5	9/23/79	136.8	2/29/80	136.4
7/15/79	135.7	9/30/79	137.0	4/01/80	136.0
7/21/79	135.9	10/20/79	135.3	4/28/80	135.1
8/13/79	136.5	10/29/79	134.5	5/28/80	136.1
8/15/79	135.9	11/16/79	136.1	6/27/80	136.1
9/04/79	136.8	12/02/79	136.1	8/04/80	136.1
9/10/79	137.4	12/14/79	135.9	9/30/80	135.8
9/11/79	137.4	12/31/79	136.1	9/26/80	135.6
9/17/79	137.3	1/30/80	136.5	11/04/80	135.6
				12/02/80	135.3
				3/03/81	134.8
				6/08/81	135.0
				7/22/81	134.5
				9/08/81	134.0
				11/11/81	133.6

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.19

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE ANDERSON MH-6WS

WATER LEVEL MEASURED --- Screened in Hattiesburg Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 4-in.* steel casing, 1.6 ft.** above ground surface. Ground surface is 445.9 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
7/12/79	252.0	12/19/79	251.3	5/28/80	252.7
7/18/79	252.0	12/31/79	251.5	6/27/80	252.8
8/15/79	250.1	1/30/80	251.5	8/04/80	253.2
10/30/79	252.2	3/02/80	251.4	8/28/80	253.0
11/15/79	251.3	4/01/80	252.0	9/29/80	253.2
11/29/79	251.4	4/28/80	252.3	11/04/80	253.5
				12/02/80	253.1
				3/02/81	253.8
				6/09/81	252.6
				7/22/81	252.2
				9/10/81	252.0
				11/11/81	251.3

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.20

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE ANDERSON MH-6A

WATER LEVEL MEASURED --- Screened in Upper Wilcox Group (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 6-in.* steel casing, 1.4 ft.** above ground surface. Ground surface is 444.6 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
11/15/79	269.0	3/02/80	270.4	6/27/80	270.7
11/29/79	269.2	4/01/80	269.9	8/04/80	270.8
12/19/79	269.1	4/28/80	271.4	8/28/80	270.4
12/31/79	269.3	5/28/80	271.0	9/29/80	270.3
1/30/80	271.8			11/04/80	270.0
				12/02/80	270.3
				3/02/81	270.9
				6/09/81	271.0
				7/22/81	270.8
				9/10/81	271.6
				11/11/81	272.4

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*To convert inches to millimeters, multiply by 25.4.

**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.21

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE ANDERSON MH-6B

WATER LEVEL MEASURED --- Screened in Kosciusko (Sparta) Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 6-in.* steel casing, 1.8 ft.** above ground surface. Ground surface is 446.1 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
11/15/79	212.9	3/02/80	212.9	6/27/80	212.9
11/29/79	212.9	4/01/80	213.2	8/04/80	212.7
12/17/79	212.8	4/28/80	213.2	8/28/80	212.4
12/31/79	213.0	5/28/80	213.0	9/29/80	212.6
1/30/80	213.0			11/04/80	212.6
				12/02/80	212.6
				3/02/81	212.2
				6/09/81	211.9
				7/22/81	212.7
				9/10/81	211.5
				11/11/81	211.2

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.22

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE ANDERSON MH-6C

WATER LEVEL MEASURED --- Screened in Cook Mountain Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 6 in. steel casing, 1.1 ft. above ground surface. Ground surface is 445.0 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
5/18/80	244.2	8/04/80	244.6	9/29/80	244.4
6/27/80	244.4	8/28/80	244.4	11/04/80	243.5
				12/02/80	243.6
				3/02/81	243.6
				6/09/81	243.5
				7/22/81	243.1
				9/22/81	243.2
				11/11/81	242.9

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.23

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE ANDERSON MH-6D

WATER LEVEL MEASURED --- Screened in Catahoula Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 6-in.* steel casing, 1.3 ft.** above ground surface. Ground surface is 446.2 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
1/30/80	197.4	4/28/80	197.5	8/04/80	196.9
3/02/80	196.7	5/28/80	197.4	8/28/80	196.1
4/01/80	198.5	6/27/80	197.0	9/29/80	196.7
				11/04/80	196.8
				12/02/80	196.6
				3/02/81	196.3
				6/09/81	195.9
				7/22/81	195.6
				9/10/81	195.4
				11/11/81	195.0

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.24

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE BEARD MH-7WS

WATER LEVEL MEASURED --- Screened in Hattiesburg Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 4-in.* steel casing, 1.1 ft.** above ground surface. Ground surface is 203.9 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
7/21/79	138.8	11/30/79	139.6	4/25/80	139.7
7/29/79	139.0	12/15/79	138.1	5/28/80	139.0
10/30/79	139.2	12/31/79	137.6	6/24/80	138.1
11/15/79	139.3	2/04/80	138.0	7/30/80	137.0
11/29/79	139.6	3/02/80	137.4	8/28/80	136.0
10/30/79	139.2	3/31/80	138.1	9/29/80	135.9
11/15/79	139.3			10/31/80	135.9
				12/01/80	135.2
				3/06/81	135.8
				6/08/81	136.2
				7/21/81	138.1
				9/09/81	136.2
				11/12/81	137.5

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.25

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE BEARD MH-7A

WATER LEVEL MEASURED --- Screened in Upper Wilcox Group (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic pressure-gauge measurements. Measuring point: center line of 1/2-in.* tap into 6 in.* steel casing, 0.9 ft.** above ground surface. Ground surface is 210.4 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
9/25/79	273.7	11/30/79	274.4	5/28/80	266.7
9/30/79	273.7	12/31/79	270.4	6/24/80	266.7
10/15/79	274.1	2/08/80	269.1	7/30/80	267.9
10/30/79	274.4	3/02/80	264.4	8/28/80	265.6
11/06/79	273.2	4/28/80	266.7	9/29/80	266.7
11/15/79	274.4			10/31/80	266.8
				12/01/80	264.4
				3/06/81	264.4
				6/08/81	264.2
				7/21/81	264.2
				9/09/81	263.1

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.26

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE BEARD MH-7B

WATER LEVEL MEASURED --- Screened in Kosciusko (Sparta) Formation. (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic pressure-gauge measurements. Measuring point: center line of 1/2 in.* tap into 6 in. steel casing, 0.7 ft.** above ground surface. Ground surface is 208.8 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
9/25/79	242.0	11/15/79	240.5	6/24/80	241.1
9/30/79	242.0	2/04/80	243.6	7/30/80	248.8
10/15/79	241.4	3/28/80	243.7	8/28/80	244.2
10/30/79	241.8	4/25/80	242.2	9/29/80	244.2
11/06/79	241.4	5/28/80	242.4	10/31/80	246.4
				12/01/80	246.4
				3/06/81	240.3
				6/08/81	242.8
				7/21/81	237.1
				9/09/81	239.7

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.27

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE BEARD MH-7C

WATER LEVEL MEASURED --- Screened in Cook Mountain Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic pressure-gauge measurements. Measuring point: center line of 1/2 in.* tap into 6 in. steel casing, 0.4 ft.** above ground surface. Ground surface is 210.1 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
3/28/80	247.5	6/24/80	253.2	8/28/80	254.4
4/25/80	253.2	7/30/80	253.2	9/29/80	254.4
5/28/80	254.4			10/31/80	254.4
				12/01/80	254.4
				3/06/81	256.7
				6/08/81	254.4
				7/21/81	256.7

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.28

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE BEARD MH-7D

WATER LEVEL MEASURED --- Screened in Catahoula Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 6 in. steel casing, 1.3 ft. above ground surface. Ground surface is 207.9 ft . MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
9/30/79	162.2	12/31/79	160.4	5/28/80	161.0
10/04/79	162.1	2/04/80	161.3	6/24/80	159.6
10/30/79	161.6	3/02/80	160.7	7/30/80	159.4
11/15/79	161.9	3/28/80	161.7	8/28/80	159.0
11/30/79	161.5	4/25/80	161.3	9/29/80	158.6
12/14/79	161.9			10/31/80	159.2
				12/01/80	159.3
				3/06/81	158.9
				6/08/81	156.2
				7/21/81	156.4
				9/09/81	155.8
				11/12/81	156.3

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

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MISSISSIPPI STUDY AREA

TABLE C-2.29

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE MASONITE MH-8WS

WATER LEVEL MEASURED --- Screened in Hattiesburg Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 4-in.* steel casing, 4.9 ft.** above ground surface. Ground surface is 247.3 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
2/28/80	161.1	5/28/80	161.7	8/28/80	161.4
3/28/80	161.4	6/27/80	161.0	9/26/80	161.4
4/28/80	161.6	8/04/80	161.6	11/04/80	162.1
				12/02/80	162.1
				3/03/81	161.9
				6/08/81	161.6
				7/22/81	161.2
				9/08/81	161.1
				11/11/81	160.8

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*To convert inches to millimeters, multiply by 25.4.

**To convert feet to meters, multiply by 0.3048.

[redacted]

MISSISSIPPI STUDY AREA

TABLE C-2.30

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE MASONITE MH-8A

WATER LEVEL MEASURED --- Screened in Upper Wilcox Group (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 6-in.* steel casing, 1.7 ft.** above ground surface. Ground surface is 244.3 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
12/30/79	200.0	4/28/80	200.7	8/04/80	201.1
1/30/80	200.6	5/28/80	201.1	8/28/80	200.6
2/28/80	200.8	6/27/80	201.9	9/26/80	200.6
3/28/80	201.1			11/04/80	203.5
				12/02/80	203.1
				3/03/81	204.4
				6/08/81	204.7
				7/22/81	204.6
				9/08/81	204.6
				11/11/81	201.4

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

[redacted]

MISSISSIPPI STUDY AREA

TABLE C-2.31

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE MASONITE MH-8C

WATER LEVEL MEASURED --- Screened in Cook Mountain Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic pressure-gauge measurements. Measuring point: center line of 1-in.* tap into 6 in. steel casing, 2.1 ft.** above ground surface. Ground surface is 245.0 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
1/18/80	485.0	2/28/80	505.8	6/27/80	501.2
1/19/80	492.0	3/28/80	508.1	8/04/80	503.5
1/20/80	485.0	4/28/80	489.8	8/28/80	505.8
1/21/80	485.0	5/28/80	496.6	9/26/80	508.1
1/30/80	482.7			11/04/80	510.5
				12/02/80	515.1
				3/03/81	524.3
				6/08/81	525.1
				7/22/81	528.5
				9/08/81	530.8

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.32

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE MASONITE MRIG-9WS

WATER LEVEL MEASURED --- Screened in Hattiesburg Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details.)

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 4-in.* steel casing, 0.7 ft.** above ground surface. Ground surface is 256.2 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
1/31/80	153.1	4/30/80	154.2	7/30/80	153.3
2/29/80	153.8	5/27/80	154.1	9/02/80	153.3
3/31/80	154.8	7/03/80	153.5	9/26/80	152.9
				11/07/80	153.2
				12/10/80	152.3
				3/05/81	152.4
				6/09/81	152.7
				7/21/81	152.4
				9/09/81	152.3
				11/12/81	151.8

T-1675-1

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.33

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE MASONITE MRIG-9

WATER LEVEL MEASURED --- Uncased core hole in Richton Dome Caprock (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 8-in.* steel casing, 1.4 ft.** above ground surface. Ground surface is 256.0 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
1/31/80	129.6	4/30/80	139.5	7/30/80	142.6
2/29/80	133.8	5/27/80	139.7	9/02/80	143.1
3/31/80	137.1	7/03/80	141.5	9/26/80	142.9
				11/07/80	144.0
				12/10/80	144.6
				3/05/81	145.0
				6/09/81	146.0
				7/21/81	146.0
				9/09/81	146.1
				11/12/81	146.0

T-1676-1

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.34

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE MASONITE MRIG-10WS

WATER LEVEL MEASURED --- Screened in Hattiesburg Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 4 in. steel casing, 2.6 ft. above ground surface. Ground surface is 282.6 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
2/29/80	173.8	5/27/80	174.2	9/02/80	173.7
3/31/80	174.2	7/03/80	174.0	9/26/80	174.0
4/30/80	174.1	7/30/80	174.2	11/07/80	172.2
				11/28/80	172.4
				3/05/81	171.7
				6/09/81	171.6
				7/21/81	171.9
				9/09/81	171.7
				11/12/81	171.3

T-1677-1

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.35

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE MASONITE MRIG-10

WATER LEVEL MEASURED --- Screened in Upper Wilcox Group (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 6-in.* steel casing, 1.1 ft.** above ground surface. Ground surface is 284.6 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
11/16/79	252.1	2/29/80	252.9	7/03/80	253.4
11/29/79	252.6	3/31/80	253.6	7/30/80	253.4
12/14/79	252.7	4/30/80	253.5	9/02/80	253.2
12/31/79	253.0	5/27/80	253.4	9/26/80	253.1
2/01/80	253.1			11/07/80	253.2
				11/28/80	253.4
				3/05/81	253.7
				6/09/81	253.4
				7/21/81	253.2
				9/09/81	253.1
				11/12/81	252.9

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.36

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE SMITH MRIH-11WS

WATER LEVEL MEASURED --- Screened in Hattiesburg Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 4-in.* steel casing. 1.8 ft.** above ground surface. Ground surface is 188.3 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
8/15/79	111.8	4/02/80	114.1	7/30/80	112.7
2/01/80	113.1	5/27/80	114.5	9/02/80	112.3
2/29/80	114.0	6/27/80	113.8	9/26/80	110.9
				11/07/80	111.9
				12/05/80	112.0

T-1679-1

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.37

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE SMITH MRIH-11A

WATER LEVEL MEASURED --- Screened in Lower Wilcox Group (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 8-in.* steel casing, 1.5 ft.** above ground surface. Ground surface is 180.4 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
11/29/79	89.4	2/29/80	91.5	6/27/80	92.9
12/14/79	90.2	4/02/80	92.6	7/30/80	93.6
12/31/79	90.7	4/30/80	92.6	9/02/80	93.4
2/01/80	91.4	5/27/80	93.1	9/26/80	93.5
				11/07/80	93.8
				3/09/81	94.9
				6/09/81	95.4
				7/21/81	95.4
				9/09/81	95.7
				11/12/81	95.8

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.38

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE SMITH MRIH-11B

WATER LEVEL MEASURED --- Screened in Upper Wilcox Group (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic pressure-gauge measurements. Measuring point: center line of 1-in.* tap into 8 in. steel casing, 16 ft.** above ground surface. Ground surface is 184.1 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
2/01/80	214.7	4/30/80	214.1	7/30/80	212.1
2/29/80	214.3	5/27/80	215.7	9/02/80	212.7
3/31/80	214.8	6/27/80	216.2	9/26/80	212.5
				11/07/80	213.4
				12/05/80	212.7
				3/09/81	214.9
				6/09/81	212.9
				7/21/81	212.0
				9/09/81	212.4

T-1681-1

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.39

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE SMITH MRIH-11C

WATER LEVEL MEASURED --- Screened in Cook Mountain Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic pressure-gauge measurements. Measuring point: center line of 1-in.* tap into 6 in. steel casing, 0.4 ft.** above ground surface. Ground surface is 183.3 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
2/08/80	239.1	5/27/80	243.8	9/02/80	239.1
4/02/80	241.5	6/27/80	244.9	9/26/80	240.3
4/30/80	241.5	7/30/80	241.5	11/07/80	241.5
				12/05/80	239.2
				3/09/81	241.5
				6/09/81	241.5
				7/21/81	241.5
				9/09/81	239.3

T-1682-1

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

MISSISSIPPI STUDY AREA

TABLE C-2.40

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE SMITH MRIH-11D

WATER LEVEL MEASURED --- Screened in Catahoula Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding measurements. Measuring point: top of 6-in.* steel casing, 1.3 ft.** above ground surface. Ground surface is 181.7 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
12/14/79	161.3	4/02/80	161.8	7/30/80	161.0
12/31/79	161.4	4/30/80	161.3	9/02/80	160.6
2/01/80	161.5	5/27/80	161.4	9/26/80	160.3
2/29/80	161.5	6/27/80	161.7	11/07/80	160.0
				12/05/80	160.3
				3/09/81	160.1
				6/09/81	159.7
				7/21/81	159.4
				9/09/81	159.3
				11/12/81	158.7

T-1683-1

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*To convert inches to millimeters, multiply by 25.4.
**To convert feet to meters, multiply by 0.3048.

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MISSISSIPPI STUDY AREA

APPENDIX C-3

WATER SAMPLING TECHNIQUES

Water chemistry data were obtained from USGS files and from analyses performed on samples collected by Law Engineering and USGS personnel during field investigations. These data are presented in Tables C-3.1 through C-3.4.

At the beginning of the program, water samples were collected from the end of the pump discharge pipe during aquifer testing. Samples were placed in plastic containers that had been rinsed with acid and distilled water. Acid was added to the samples as appropriate for preservation. Samples to be analyzed for dissolved metals were filtered on site, using 0.45-micron filters and either peristaltic or pressure filtration techniques. Field parameters were measured in a container placed at the end of the discharge pipe.

In December 1979, procedural changes were initiated in the method of sample collection. Modified procedures included nitrogenous-vacuum filtration and field parameter measurement utilizing a flow-through chamber and bottom-discharge (Figures C-3.1 and C-3.2).

High pH values of the water samples from Wells MH-4B, MH-5B, MH-6C, and MH-7C indicated that contamination from drilling fluids in the formation could have affected water chemistry. These wells were resampled with a downhole fluid sampler.

The following list summarizes chemical parameters analyzed from the water samples.

ANALYTICAL PARAMETER

Aluminum, dissolved
Cadmium, dissolved
Chromium, dissolved
Cobalt, dissolved
Copper, dissolved
Copper, total
Iron, dissolved
Iron, total
Lead, dissolved
Lead total
Manganese, dissolved
Zinc, dissolved
Strontium, dissolved
Potassium, total
Sodium, total
Calcium, total
Magnesium, total
Lithium, total
Nitrate, as nitrogen
Sulfate
Chloride
Iodide
Bromide
Boron
Fluoride
Hardness
Solids, total residue
Alkalinity
Density
SiO_2, dissolved

While aquifer tests were being run, gas sampling was conducted on all wells suspected of containing gaseous hydrocarbons. Figure C-3.3 illustrates the sampling apparatus.

The methodologies employed in these analyses are those published by Franson (1971) and the U.S. Environmental Protection Agency (1971).

In order to observe any major differences in water chemistry between the initial and terminal phases during aquifer testing, samples were collected at 6- and 24-hour intervals in selected wells. Water from most wells underwent some chemical change during the period of testing.

Field parameters measured coincidentally with aquifer testing were temperature, pH, conductivity, and oxidation reduction potential. A variety of instruments was used to measure these parameters, including a Hydrolab TC-2, Hydrolab 4000 and Hydrolab 8000 systems, and an Orion Specific Ion pH Meter. All instruments were calibrated according to manufacturers' specifications and at time intervals adequate to assure proper field function.

MISSISSIPPI STUDY AREA
APPENDIX C-3
TABLE C-3.1 (PAGE 1 OF 9)
SELECTED CHEMICAL ANALYSES OF REGIONAL GROUND WATER FROM MIOCENE AGE AND YOUNGER DEPOSITS

(Analyses reported in milligrams per liter except as noted.)

Data Source	Well	USGS Identifier	Approximate Sample Depth	Aquifer	Date of Collection	Sodium dissolved (as Na)	Chloride dissolved (as Cl)	Bicarbonate (as HCO3)	Silica dissolved (as SiO2)	Sulfate dissolved (as SO4)	Calcium dissolved (as Ca)	Iron, Total Recoverable (ug/l as Fe)	Magnesium dissolved (as Mg)	Potassium dissolved (as K)	Manganese dissolved (ug/l as Mn)	Fluoride dissolved (as F)	Boron dissolved (ug/l as B)	Dissolved Solids, (Residue at 180°C)	Alkalinity (as CaCO3)	Hardness (as CaCO3)	pH (s.u.)	Specific Conductance (micromhos)
USGS	83	310827-09143?06	273-440	Hattiesburg	08/14/61	2.8	3.0	17	14	0.2	2.1	0	0.9	2.1	0	-	0	30	-	8	6.6	36
USGS	43	312414-08521901	175	Miocene	01/27/71	7.3	3.0	-	-	9.6	2.0	750	2.4	2.5	-	0	-	-	21	15	6.1	-
USGS	15	311509-08530401	-	Miocene	10/16/64	14	4.0	51	26	6.0	4.1	860	2.9	3.4	-	0.2	-	93	-	22	6.2	110
USGS	123	310346-09371501	425	Miocene	01/22/62	4.8	2.9	30	7.5	0.6	1.5	1300	1.3	1.1	-	0	0	40	-	9	6.0	57
USGS	110	310550-09224501	160	Hattiesburg	01/23/62	5.5	2.0	25	32	0.8	1.8	50	0.4	1.8	-	0.2	0	64	-	6	6.7	41
USGS	167	311446-08490501	440-500	Miocene	09/12/61	5.0	2.0	19	21	12	2.9	2000	2.0	3.3	-	0	-	5	16	15	6.9	60
USGS	5	312236-08513301	125	Catahoula	06/16/65	7.8	2.7	34	26	5.2	3.9	7900	2.0	2.9	-	0	-	66	-	10	6.0	81
USGS	64	312400-08523701	74-79	Miocene	08/22/78	6.8	1.8	21	26	0.3	3.0	50000	1.1	3.0	40	0	-	62	17	12	6.3	75
USGS	7	311613-08550001	-	Hattiesburg	08/23/78	2.4	2.0	5	13	0.7	0.7	1400	0.2	1.1	0	0	-	20	4	3	5.9	25
USGS	87	312400-08523701	-	Miocene	10/23/79	10	3.3	20	27	0.7	2.0	25000	1.2	2.8	50	0.1	40	86	16	12	6.1	60
USGS	119A	310934-09252101	-	Miocene	01/20/73	4.1	2.3	14	21	0.1	0.9	200	0.1	1.5	-	0.1	-	44	11	11	5.7	40
USGS	122	310328-09283601	610-650	Miocene	07/28/78	23	5.0	-	1.6	18	2.4	25000	0	2.5	-	0.1	-	78	18	4	5.9	-
USGS	105	312506-09322101	-	Hattiesburg	03/31/64	3.0	3.2	17	27	0	2.3	50	0.9	2.0	-	0.1	40	80	-	10	6.7	47
USGS	96	311629-09222104	-	Hattiesburg	12/12/61	6.7	2.9	12	2.0	5.6	1.0	1200	0.6	1.3	-	0.4	0	45	-	5	6.1	64
USGS	133	312549-09402001	-	Hattiesburg	08/23/78	2.0	3.7	6	9.4	1.1	1.0	200	0.5	0.7	0	0	-	31	5	5	5.5	24
USGS	137	311404-09520001	522	Hattiesburg	08/17/66	3.9	3.0	9	23	11	2.7	190	0.8	2.3	-	0.1	-	54	-	10	5.8	49
USGS	146	311619-09462501	126-146	Miocene	04/27/66	1.0	2.9	5	9.0	0.6	0.9	10	0.6	0.3	-	0.1	-	22	4	5	5.7	20
USGS	139B	311450-09491001	167	Miocene	04/27/66	3.5	4.3	10	21	0.2	1.0	1000	0.8	1.4	-	0.1	-	49	8	8	6.4	39
USGS	139A	311450-09491001	167	Miocene	04/27/66	3.5	4.3	10	21	0.2	1.0	100	0.8	1.4	-	0.1	-	49	8	8	6.4	39
USGS	78	312238-09190201	75	Miocene	08/04/78	1.6	2.2	3	8.4	0.2	0.7	400	0.5	0.5	20	0	-	26	2	4	5.2	22
USGS	86	310813-09130201	565-585	Hattiesburg	09/03/64	1.0	3.4	2	8.2	0	1.4	310	0.4,	0.4	-	0	-	32	-	5	5.3	27
USGS	405	311516-08585001	83-118	Hattiesburg	06/06/79	3.6	2.9	10	17	1.6	0.7	600	0.3	1.1	20	0	2	40	0	2	5.3	34 ms.

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MISSISSIPPI STUDY AREA
APPENDIX C-3
TABLE C-3.1 (PAGE 2 OF 5)
SELECTED CHEMICAL ANALYSES OF REGIONAL GROUND WATER FROM MIOCENE AGE AND YOUNGER DEPOSITS

(Analyses reported in milligrams per liter except as noted.)

Data Source	Well	USGS Identifier	Approximate Sample Depth	Aquifier	Date of Collection	Sodium dissolved (as Na)	Chloride dissolved (as Cl)	Bicarbonate (as HCO3)	Silica dissolved (as SiO2)	Sulfate dissolved (as SO4)	Calcium dissolved (as Ca)	Iron, Total Recoverable (ug/l as Fe)	Magnesium dissolved (as Mg)	Potassium dissolved (as K)	Manganese dissolved (ug/l as Mn)	Fluoride dissolved (as F)	Boron dissolved (ug/l as B)	Dissolved Solids, (Residue at 180°C)	Alkalinity (as CaCO3)	Hardness (as CaCO3)	pH (s.u.)	Specific Conductance (micromhos)
USGS	32	311256-09024501	613-620	Miocene	11/16/79	160	68	300	12	0.3	0.4	200	0	1.1	3	1.1	-	374	260	1	8.7	560
USGS	13	311213-09015302	701-721	Catahoula	08/23/78	120	66	210	12	1.9	0.4	100	0.1	1.1	0	0.4	-	321	170	1	8.9	530
USGS	37A	311222-09015801	736-756	Miocene	05/27/64	104	42	201	12	0	0	70	0.5	0.2	-	0.4	170	256	-	2	8.1	437
USGS	37B	311222-09015801	756-786	Miocene	05/27/64	104	42	204	12	0	-	700	0.5	0.2	0	0.4	-	256	165	2	8.1	437
USGS	19	311401-09550201	-	Miocene	08/23/78	95	59	130	13	6.5	0.7	4100	0.2	1.1	10	0.1	-	260	110	3	9.1	430
USGS	12	311215-09023301	-	Catahoula	04/07/78	150	65	329	26	6.0	0.4	80	2.6	-	-	-	-	-	-	-	-	-
USGS	34	311434-09015804	505-525	Miocene	06/15/65	86	21	199	12	0	0.8	80	0	1.20	-	0.5	-	235	-	2	7.6	385
USGS	124	310019-09265501	-	Miocene	09/12/61	67	3.0	122	27	1.6	0	40	0	1.6	-	0.7	100	200	-	8	7.6	123
USGS	106	311804-09315901	400	Catahoula	01/23/62	9.6	3.0	63	43	0.0	9.6	8900	2.2	2.3	-	0.1	0	126	-	33	6.0	120
USGS	111	311305-09234401	330-350	Miocene	03/13/73	36	9.0	65	29	2.0	2.0	3200	1.0	-	-	-	-	110 calc	53	9	6.1	-
USGS	112	311305-09234402	660-680	Miocene	03/13/73	10	6.0	79	40	2.0	14	4800	1.0	-	50	0.1	-	111	65	49	6.1	282
USGS	114	310517-09355508	1190	Miocene	03/23/67	15	6.3	78	52	6.2	9.0	5700	2.1	4.5	-	0.2	-	137	57	-	6.5	130
USGS	117	310559-09251302	320	Miocene	01/23/62	10	6.3	66	66	0.6	4.7	620	0.7	1.3	-	0.1	0	100	-	15	6.0	80
USGS	102	312055-09370801	230-250	Hattiesburg	01/24/62	8.5	1.3	49	52	0.6	5.3	5600	2.1	2.0	-	0	-	120	-	22	6.2	89
USGS	109B	311923-09215701	305-310	Hattiesburg	10/08/65	6.9	3.0	61	68	0.0	12	520	0	2.3	-	0	-	113	-	30	6.2	105
USGS	116	310813-09243401	915-975	Hattiesburg	02/19/62	19	4.1	46	63	4.6	2.0	80	0	1.4	-	0.2	0	-	-	-	[illegible]	100
USGS	115	310049-09214201	-	Hattiesburg	05/26/66	23	2.6	89	66	3.6	0.5	190	1.4	1.9	-	0.1	-	132	-	27	6.8	167
USGS	97B	312002-09225402	736-786	Miocene	08/27/70	33	5.0	-	0	12	0.0	500	3.6	6.7	-	0	-	126	95	37	7.6	-
USGS	123B	310310-09283602	610-650	Hattiesburg	03/04/71	39	5.0	80	0	7.6	3.2	900	0	1.0	-	0	-	106	80	8	6.8	-
USGS	20	311657-09062701	-	Miocene	06/15/65	68	6.0	160	11	6.6	0.7	60	0.1	0.9	-	0.4	-	189	-	2	7.3	292
USGS	29	311906-09060084	-	Miocene	08/15/65	33	3.7	120	19	7.0	9.6	400	3.4	3.0	-	0.1	-	148	-	18	6.9	223
USGS	300	311228-09014701	420-425	Miocene	11/01/67	20	3.5	106	25	12	9.4	14000	3.0	2.6	-	0.1	-	135	85	56	6.9	202
USGS	31	311330-09030601	-	Miocene	01/16/79	65	3.0	170	15	5.5	5.0	1000	0.3	0.6	20	9.4	-	181	140	14	8.5	300
USGS	1	312229-09064001	276-296	Miocene	09/01/55	45	3.5	136	-	9.8	6.7	30	1.6	2.2	-	0.2	-	156	-	23	8.0	270
USGS	39	312310-09061401	330-380	Miocene	07/13/78	45	2.0	160	3.2	9.3	5.3	390	1.5	2.1	20	0.1	-	152	110	19	8.1	261

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MISSISSIPPI STUDY AREA
APPENDIX C-3
TABLE C-3.1 (PAGE 3 OF 8)

SELECTED CHEMICAL ANALYSES OF REGIONAL GROUND WATER FROM
MIOCENE AGE AND YOUNGER DEPOSITS
(Analyses reported in milligrams per liter except as noted.)

Data Source	Well	USGS Identifier	Approximate Sample Depth	Aquifier	Date of Collection	Sodium dissolved (as Na)	Chloride dissolved (as Cl)	Bicarbonate (as HCO$_3$)	Silica dissolved (as SiO$_2$)	Sulfate dissolved (as SO$_4$)	Calcium dissolved (as Ca)	Iron, Total Recoverable (ug/l as Fe)	Magnesium dissolved (as Mg)	Potassium dissolved (as K)	Manganese dissolved (ug/l as Mn)	Fluoride dissolved (as F)	Boron dissolved (ug/l as B)	Dissolved Solids, (Residue at 180°C)	Alkalinity (as CaCO$_3$)	Hardness (as CaCO$_3$)	pH (s.u.)	Specific Conductance (micromhos)
USGS	176A	310307-89255201	640	Miocene	01/22/62	63	3.0	169	27	3.0	3.1	1000	0.5	0.8	-	0.4	140	195	-	10	7.7	260
USGS	99A	312003-89225501	730-770	Catahoula	05/01/61	30	2.6	116	10	0.2	9.8	-	3.5	4.2	-	-	-	130	95	19	7.5	201
USGS	113	311326-89234201	713-793	Miocene	08/3/78	65	3.1	150	16	6.3	0.8	400	0.1	0.6	10	0.4	-	173	120	2	6.9	265
USGS	120	310352-89365401	468-510	Miocene	07/25/61	47	6.5	137	31	6.0	9.1	70	0.8	1.6	-	0.2	50	188	-	26	7.3	254
USGS	79A	311156-89131001	400	Hattiesburg	01/10/66	14	5.3	56	58	7.0	5.5	1300	5.0	3.8	-	0.1	-	130	46	26	5.8	130
USGS	76	311112-89205001	340	Hatties-	06/14/65	16	4.7	68	5.3	7.0	9.9	5000	2.0	2.0	-	0.1	-	129	-	13	6.4	142
USGS	153	310725-89492801	200	Miocene	10/27/66	38	3.5	90	26	9.4	2.0	30	0.5	1.6	-	0.1	-	127	-	7	7.3	167
USGS	156	310141-89443501	850	Hattiesburg	01/24/62	18	2.9	44	47	7.6	2.0	1500	0.5	1.7	-	0.2	0	115	-	7	6.5	106
USGS	151	310935-89510601	650	Hattiesburg	08/18/66	12	3.0	37	26	8.0	6.0	3000	0.5	2.9	-	0.1	-	100	-	12	6.6	90
USGS	132	311839-89550001	-	Miocene	10/25/66	7.2	2.0	57	55	6.2	9.2	220	2.7	1.6	-	0.1	-	116		36	6.9	116
USGS	152	310741-89491501	700	Miocene	08/18/66	28	5.3	68	44	10	2.1	660	0.4	1.9	-	0.1	-	109		7	6.9	133
USGS	65	310516-89172901	346	Hattiesburg	06/14/65	2.6	5.8	90	65	7.6	8.6	370	2.8	2.2	-	0.1	-	162	-	33	6.6	182
USGS	52	312105-89194901	537-622	Catahoula	06/19/59	33	2.0	-	17	0.0	0.2	100	2.6	-	-	0	-	127	93	-	7.9	-
USGS	71B	311735-89165001	650-694	Catahoula	08/25/66	33	2.0	-	17	0.0	0.2	100	2.6	-	-	0	-	127	93	-	7.9	-
USGS	67	312015-89184201	591-687	Catahoula	09/16/65	22	2.0	90	1.4	0.6	0.1	520	4.1	3.6	-	0.1	-	100		17	6.9	177
USGS	90B	310406-89112701	540-580	Hattiesburg	09/16/71	35	7.0	-	-	6.1	2.6	600	2.2	8.0	-	0	-	100	77	15	6.5	-
USGS	77	311730-89162001	857-897	Miocene	08/06/78	24	3.7	53	16	7.0	1.6	5700	0.6	2.5	10	0.1	-	105	43	6	6.3	125
USGS	57A	312152-89184001	616-654	Miocene	02/06/76	32	4.0	-	3.2	10	6.6	350	2.2	5.0	-	0	-	115	86	25	7.3	-
USGS	84B	311110-89134201	352-432	Hattiesburg	06/27/70	16	5.6	78	61	5	10	20	3.2	6.0	-	0.3	-	143	64	38	6.9	169
USGS	83	311142-89091301	400	Hattiesburg	05/03/71	24	4.1	77	48	7.0	6.8	200	1.7	-	-	0.1	-	133	63	24	7.7	146
USGS	82C	311145-89111901	400	Hattiesburg	03/01/71	26	3.0	89	60	5.6	7.6	3400	2.1	-	-	0.1	-	149	73	27	7.3	155
USGS	82B	311145-89111901	400	Hattiesburg	11/03/70	20	4.4	72	58	6.6	8.0	440	1.5	4.1	-	0.1	-	150	-	26	7.2	160
USGS	81	311142-89114701	400	Hattiesburg	01/10/66	19	4.8	72	59	6.8	8.5	1420	3.2	3.8	-	0.2	-	139	59	26	6.3	163
USGS	80	311112-89131001	400	Hattiesburg	01/10/66	15	3.8	66	61	7.6	7.0	1700	3.0	3.7	-	1.6	-	148	56	31	6.3	160
USGS	79D	311156-89130001	400	Hattiesburg	05/03/71	18	4.1	65	57	7.2	8.0	380	1.9	-	-	0.1	-	125	53	28		132
USGS	79C	311156-89131001	400	Hattiesburg	11/03/70	20	7.0	76	58	6.0	9.0	490	2.3	6.9	-	0.1	-	165		32	7.5	165

MISSISSIPPI STUDY AREA
APPENDIX C-3
TABLE C-3.1 (PAGE 4 OF 5)

SELECTED CHEMICAL ANALYSES OF REGIONAL GROUND WATER FROM
MIOCENE AGE AND YOUNGER DEPOSITS
(Analyses reported in milligrams per liter except as noted.)

Data Source	Well	USGS Identifier	Approximate Sample Depth	Aquifer	Date of Collection	Sodium dissolved (as Na)	Chloride dissolved (as Cl)	Bicarbonate (as HCO3)	Silica dissolved (as SiO2)	Sulfate dissolved (as SO4)	Calcium dissolved (as Ca)	Iron, Total Recoverable (µg/l as Fe)	Magnesium dissolved (as Mg)	Potassium dissolved (as K)	Manganese dissolved (µg/l as Mn)	Fluoride dissolved (as F)	Boron dissolved (µg/l as B)	Dissolved Solids (Residue at 180°C)	Alkalinity (as CaCO3)	Hardness (as CaCO3)	pH (units)	Specific Conductance (micromhos)
USGS	92B	308130-0910420[illegible]	770	Hattiesburg	11/28/67	39	5.0	160	51	7.0	3.0	490	1.3	1.4	-	0.2	-	157	-	11	6.8	198
USGS	92A	308130-0910420[illegible]	728	Hattiesburg	07/16/53	-	4.4	105	52	7.6	3.6	-	1.5	-	-	0.1	-	160 calc	-	15	7.6	-
USGS	91	308115-[illegible]	-	Miocene	01/21/74	100	4.0	107	56	7.2	3.2	340	0.87	1.6	890	0.27	-	160	88	-	5.8	175
USGS	570	312152-[illegible]	454	Miocene	02/06/74	38	4.6	415	12	9.6	11	350	4.0	4.9	-	0.2	-	129	96	46	7.6	296
USGS	89	308326-[illegible]	485-575	Hattiesburg	05/03/64	56	3.6	130	38	9.6	0.1	200	0.2	0.0	-	0.6	-	172	-	1	7.6	240
USGS	88	308620-[illegible]	-	Hattiesburg	11/20/67	35	3.5	101	52	6.6	4.8	2200	0.5	1.2	-	0.1	-	160	-	16	6.9	184
USGS	87	308129-[illegible]	-	Hattiesburg	11/20/67	37	3.0	105	56	6.2	5.1	1000	1.0	1.1	-	0.1	-	165	-	12	7.0	192
USGS	111	310715-[illegible]	521	Catahoula	10/18/66	56	2.4	137	34	6.4	0.9	270	0.1	2.0	-	0.1	-	168	-	4	7.6	219
USGS	134	311000-[illegible]	750-796	Catahoula	05/09/74	38	1.7	122	19	0.8	4.2	170	1.7	4.7	-	0.1	-	151	100	11	7.6	215
USGS	138	311425-[illegible]	-	Catahoula	07/29/66	50	2.1	120	15	9.2	2.9	0	0.2	2.1	-	0.1	-	136	-	8	7.1	214
USGS	154A	310852-[illegible]	17	Catahoula	01/24/62	55	1.7	140	12	6.6	1.0	60	0.1	1.1	-	0.2	90	153	-	5	7.7	236
USGS	154B	310852-[illegible]	17	Catahoula	01/24/62	55	1.7	140	12	6.6	1.0	400	0.1	1.1	-	0.2		153	115	5	7.7	230
USGS	116	311618-[illegible]	-	Miocene	04/26/74	53	2.1	142	14	5.9	4.1	40	1.0	1.1	-	0.5		176	116	14	8.0	240
USGS	148	311127-[illegible]	723	Miocene	04/26/74	55	1.6	142	16	8.0	3.1	60	0	1.1		0.1	-	162	117	8	8.1	275
USGS	178	311655-[illegible]	510	Miocene	09/24/62	1.7	1.0	11	3.9	0.2	9.0	2200	2.3	1.2	-	0.1	0	82	-	32	6.2	93
USGS	95	311856-[illegible]	503-513	Miocene	01/25/62	0.3	1.9	40	42	6.0	5.0	4900	0.9	2.2	-	0.1	40	91	-	16	6.1	79
USGS	581	312504-[illegible]	440	Miocene	01/23/62	3.9	3.1	22	20	1.0	4.5	300	0.7	1.1	-	0.2	50	68	-	14	5.9	62
USGS	104	312506-[illegible]	349-409	Miocene	07/18/19	-	5.1	11	20	3.5	3.6	190	1.5	-		-	-	77	-		-	-
USGS	107	311540-[illegible]	709-774	Miocene	08/23/62	14	6.1	56	20	0.6	6.1	100	1.5	2.2	-	0.2	0	98	-	18	6.4	161
USGS	110	311240-[illegible]	455	Miocene	01/18/62	16	3.0	64	32	0	6.0	2000	1.7	1.6		0.1	0	95	-	22	6.9	121
USGS	101	312505-[illegible]	586-706	Hattiesburg	01/26/62	5.5	1.2	41	15	0.0	6.6	6400	2.6	1.6		0.1	0	62	-	22	6.2	110
USGS	129	312225-[illegible]	130	Hattiesburg	05/09/76	2.3	3.6	8	15	0.6	1.0	0	0.5	1.0		0.1	-	36	7	5	5.0	8
USGS	130	312221-[illegible]	504-514	Hattiesburg	08/23/70	2.3	3.7	10	16	0.1	1.1	10	0.5	0.7	0	0		31	8	5	5.5	29
USGS	135	312020-[illegible]	195	Hattiesburg	10/26/66	3.3	4.0	5	6.9	0.6	0.9	190	0.9	1.0		0		30	-	5	5.6	37
USGS	163	311608-[illegible]	633-685	Miocene	06/27/66	9.5	3.7	26	43	11	3.6	1600	1.0	2.8	-	0.1		87	21	11	6.6	49
USGS	162	311658-[illegible]		Miocene	06/27/66	9.0	4.1	23	43	11	2.1	1700	1.1	5.5		0.1		78	19	10	6.6	74

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TABLE C-3.1 (PAGE 5 OF 6)

SELECTED CHEMICAL ANALYSES OF REGIONAL GROUND WATER FROM
MIOCENE AGE AND YOUNGER DEPOSITS
(Analyses reported in milligrams per liter except as noted.)

Data Source	Well	USGS Identifier	Approximate Sample Depth	Aquifer	Date of Collection	Sodium dissolved (as Na)	Chloride dissolved (as Cl)	Bicarbonate (as HCO3)	Silica dissolved (as SiO2)	Sulfate dissolved (as SO4)	Calcium dissolved (as Ca)	Iron, Total Recoverable (ug/l as Fe)	Magnesium dissolved (as Mg)	Potassium dissolved (as K)	Manganese dissolved (ug/l as Mn)	Fluoride dissolved (as F)	Boron dissolved (ug/l as B)	Dissolved Solids (Residue at 180°C)	Alkalinity (as CaCO3)	Hardness (as CaCO3)	pH (S.U.)	Specific Conductance (micromhos)
USGS	300	[illegible]	163-183	Hattiesburg	05/31/76	2.0	4.0	7	10	0.9	1.3	300	0.8	1.1	10	0	20	48	6	7	5.0	27 28L
USGS	605	[illegible]	295-325	Hattiesburg	07/19/79	2.2	3.6	9	19	1.3	1.6	220	0.7	1.0	4	0	3	41	7	3	5.7	30 40L
USGS	615	[illegible]	295-325	Hattiesburg	10/04/79	2.1	0.5	25	15	0	1.7	200	0.0	1.4	20	0	60	50	21	8	5.5	40 60L
USGS	60	[illegible]	1375-1395	Catahoula	06/07/80	52	2.6	140	60	9.3	2.5	1400	0.3	0.0	3	0.2	70	193	120	4	8.5	260 260L
USGS	700	[illegible]	23-113	Hattiesburg	07/12/79	50	2.2	56	22	0.0	0.2	12000	2.6	3.6	70	0.1	50	81	44	18	6.6	125 127L
USGS	[illegible]	[illegible]	1090-1110	Catahoula	03/16/80	3200	6400	750	3.0	20	10	500	22	2.3	20	1.0	1200	8160	173	120	9.0	14000
USGS	[illegible]	[illegible]	1500-1540	Catahoula	10/25/79	230	0.0	500	11	3.2	1.4	600	.6	2.0	5	4.3	960	567	45	6	8.9	927
USGS	[illegible]	[illegible]	700-740	Catahoula	01/01/80	51	4.0	140	10	11	3.0	400	.3	2.2	6	.2	30	171	110	10	8.2	230
USGS	[illegible]	[illegible]	219-279	Hattiesburg	01/15/80	13	10	89	63	4.3	17	1000	1.0	2.6	160	.3	0	160	73	55	6.5	170
USGS	11	[illegible]	482-502	Hattiesburg	08/21/70	60	5.7	150	12	0.6	0.5	800	0.1	1.6	0	0.2	-	157	120	4	9.0	240
USGS	10	[illegible]	330	Hattiesburg	09/09/66	62	9.6	168	6.0	5.0	1.9	0	0.5	0.8	-	0.2	-	130	-	2	7.8	282
USGS	2	[illegible]	603-650	Catahoula	09/08/64	35	4.6	120	6.4	11	11	6300	5.0	2.7	-	0.1	-	144	-	48	7.2	232
USGS	10	[illegible]	193-223	Miocene	08/03/70	26	1.9	63	65	7.1	0.8	2100	0.3	1.8	10	0.1	-	113	52	3	8.5	122
USGS	23	[illegible]	260	Miocene	06/15/65	26	1.7	71	-	6.0	3.6	-	0.9	0.9	-	0.1	-	161	22	12	6.7	137
USGS	1268	[illegible]	640	Miocene	04/22/63	63	3.0	160	37	3.0	3.1	10000	0.5	0.8	0	0.4	-	195	139	10	7.7	268
USGS	790	[illegible]	400	Hattie-	06/27/70	15	5.6	71	50	5.0	9.4	80	2.1	1.9	-	0.1	-	163	50	32	6.0	130
USGS	50	[illegible]	640-680	Catahoula	01/05/67	52	1.8	114	35	9.8	7.5	100	2.2	4.2	-	0.2	-	120	-	28	7.2	200
USGS	49	[illegible]	-	Catahoula	01/25/65	21	2.0	96	11	9.8	10	640	2.9	3.8	-	0.1	-	106	-	37	7.0	187
USGS	67	[illegible]	620-670	Catahoula	07/05/64	30	1.6	140	17	8.8	7.0	420	1.5	1.7		0.2	430	171	-	32	7.1	184
USGS	91	[illegible]	529	Hattiesb	06/14/65	39	1.6	111	41	1.2	5.0	230	0.9	1.1	-	0.2	-	140	-	16	6.9	205
USGS	155	[illegible]	-	Miocene	08/10/66	0.0	2.1	20	11	10	1.0	400	0.6	2.6	-	0.1		86		9	6.6	66
USGS	1696	[illegible]	165-195	Miocene	09/26/76	3.6	1.0	15	26	4.3	3.6	0	1.0	2.0	-	0.1	-	26	12	11	5.6	0
USGS	61	[illegible]	485	Catahoula	07/05/64	9.2	2.3	41	30	0.0	3.1	910	2.0	1.6	-	0.6	-	60	-	26	6.2	97
USGS	56	[illegible]	419	Catahoula	06/09/59	6.0	2.0	-	46	8.1	5.0	1600	1.7		-	0	-	38	26	26	6.3	
USGS	68	[illegible]	351	Catahoula	10/06/65	7.6	2.6	42	10	9.8	6.5	200	3.0	4.7	-	6	-	94		30	6.7	100

L Laboratory measurement

T Total

D Dissolved

M Maximum detectable by instrument

MISSISSIPPI STUDY AREA
APPENDIX C-3
TABLE C-3.2 (PAGE 1 OF 1)
SELECTED CHEMICAL ANALYSES OF GROUND WATER FROM REGIONAL HYDROGEOLOGIC INVESTIGATION SITES IN AQUIFERS UNDERLYING MIOCENE AGE DEPOSITS

(Analyses reported in milligrams per liter except as noted.)

Data Source	Well	USGS Identifier	Sample Interval (ft)	Aquifier	Date of Collection	Sodium dissolved (as Na)	Chloride dissolved (as Cl)	Bicarbonate (as HCO_3)	Silica dissolved (as SiO_2)	Sulfate dissolved (as SO_4)	Calcium dissolved (as Ca)	Iron, Total Recoverable (ug/l as Fe)	Magnesium dissolved (as Mg)	Potassium dissolved (as K)	Manganese dissolved (ug/l as Mn)	Fluoride dissolved (as F)	Boron dissolved (ug/l as B)	Bromide dissolved (as Br)	Iodide dissolved (as I)	Dissolved Solids (Residue at 180°C)	Alkalinity (as $CaCO_3$)	Hardness (as $CaCO_3$)	pH (s.u.)	Specific Conductance (Micromhos)
USGS	MH-4A	311516 88585002	2505-2525	Wilcox	07/25/79	8500	13000	660	1.1	40	110	4100	90	49	430	0.2	1100	4.9	.87	22200 **	540	740	8.0	41100L
USGS	MH-4B*	311509 88585003	1951-1971	Kosciusko	01/16/80	11000	17000	170	4.8	75	200	60	150	4	10	0.6	1200	51	3.9	30000	139	1100	7.7	46500
USGS	MH-4C	311516 88585004	1697-1717	Cook Mountain	03/11/80	8900	14000	110	0.2	58	140	2300	130	65	460 ?	1.8	3200	36	3.8	24500	90	910	9.0	39000
USGS	MH-5A	310415 89182802	3520-3540	Wilcox	10/12/79	21000	31000	300	16	-	490	3700	340	71	500	0.4	3200	140	8.2	53200 **	250	2700	7.3	68000 77000L
USGS	MH-5B*	310429 89182803	2495-2525	Kosciusko	03/12/80	14000	22000	77	1.2	91	290	310	220	79	510	0.4	3300	69	2.2	39200	63	1700	7.6	58200
USGS	MH-5C	311516 88585004	2244-2284	Cook Mountain	03/12/80	6000	9500	250	1.2	42	26	110	52	49	30	2.2	3400	40	2.2	16200	230	290	8.8	27000
USGS	MH-6A	312555 89430002	3265-3285	Tallahatta & Wilcox	11/05/79	4600	6000	1200	13	-	21	7100	18	27	60	1.6	3300	65	1.4	11600	980	130	8.5	18500 19300L
USGS	MH 6B	312555 89430003	2724-2754	Kosciusko	11/01/79	2900	3300	1540	14	28	13	350	11	20	20	1.4	3200	27	0.65	7180	1260	79	8.1	7000 12400L
USGS	MH-6C*	312555 89430004	2388-2418	Cook Mountain	03/12/80	1200	1100	1130	29	29	1.9	940	1.0	34	10	4.7	3100	4.5	0.68	3140	1180	9	9.4	5250
USGS	MH-7A	312451 89184702	2650-2670	Wilcox	03/13/80	4100	5300	1390	6.9	36	1.8	370	14	23	10	1.8	3500	29	.97	10700	1810	64	8.9	17200
USGS	MH-7B	312451 89184703	1942-1962	Kosciusko	12/05/79	4100	6000	600	5.9	5.9	34	1400	23	30	100	1.2	3000	17	0.55	9920	490	160	8.3	13500 17000L
USGS	MH-7C*	312451 89284704	1625-1655	Cook Mountain	03/13/80	1400	1600	1140	19	10	4.2	360	5.3	23	70	3.9	3200	4.0	.62	3660	1080	31	8.6	6460
USGS	MH-8A	310906 89412402	3180-3290	Wilcox	12/13/79	16000	23000	420	16	140	260	3100	170	100	190	0.6	3000	71	5.0	40400	340	1400	7.4	65000 59000L
USGS	MH-8C	310906 89412404	2458-2498	Cook Mountain	01/22/80	13000	20000	290	16	120	230	2800	150	64	100	16	3300	50	11	33900	240	1200	7.5	39000 50000L

* - Sample obtained using a downhole sampler

** - Sum of dissolved constituents

L - Laboratory measurement

T - Total

D - Dissolved

M - Maximum detectable by instrument

T-1182-1

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MISSISSIPPI STUDY AREA
APPENDIX C-3
TABLE C-3.3 (PAGE 1 OF 3)
SELECTED CHEMICAL ANALYSES OF GROUND WATER IN VICINITY OF CANDIDATE DOMES

(Analyses reported in milligrams per liter except as noted.)

RICHTON

Data Source	Well	USGS Identifier	Sample Interval (ft)	Aquifer	Date of Collection	Sodium dissolved (as Na)	Chloride dissolved (as Cl)	Bicarbonate (as HCO3)	Silica dissolved (as SiO2)	Sulfate dissolved (as SO4)	Calcium dissolved (as Ca)	Iron, Total Recoverable (ug/l as Fe)	Magnesium dissolved (as Mg)	Potassium dissolved (as K)	Manganese dissolved (ug/l as Mn)	Fluoride dissolved (as F)	Boron dissolved (ug/l as B)	Bromide dissolved (as Br)	Iodide dissolved (as I)	Dissolved Solids (Residue at 180°C)	Alkalinity (as CaCO3)	Hardness (as CaCO3)	pH (s.u.)	Specific Conductance (Micromhos)
USGS	41	312126-088574701	28.5	Miocene	11/04/69	55	12	123	9.2	9.0	1.9	370	0.3	1.7	-	0.1	-	-	-	156	-	6	7.6	269
USGS	42	312054-088560701	620-660	Miocene	04/29/69	32	10	-	1.6	2.4	6.0	1000	1.7	1.0	-	0	-	-	-	106	<3	22	6.0	-
USGS	42	312054-088560701	620-660	Miocene	08/22/78	31	7.0	88	11	3.2	4.9	4400	1.7	2.7	10	0	-	-	-	112	72	19	6.6	185
USGS	MRIG-9ww	312220-088581401	368-378	Hattiesburg	02/02/80	96	54	180	12	5.7	4.8	100	.3	1.9	10	0.3	220	0.1	0.04	372	150	15	7.9	440 465L
USGS	MRIG-9	312220-088581402			12/04/79	120000	185000	510	31	5890	1100	55000	170	60	10	-	1300	460	1.9	310000	420	3600	6.4	162000
USGS	MRIG-10ww	312457-088571501	280-290	Hattiesburg	02/5/80	20	9.6	92	11	3.3	15	100	3.6	2.9	100	0.1	-	0	0.04	112	75	52	7.9	180 188L
USGS	MRIG-10				12/07/79	3000	4400	390	16	650	240	2500	4.6	6.7	30	0	1100	.3	.16	8920	250	620	7.6	14000
USGS	MRIG-10	312457-088571502		Wilcox	11/09/79	5300	8200	670	23	12	37	14000	12	49	40	1.6	3500	20	1.4	14400	550	230	7.5	20000
USGS	MRIH-11ww	312036-088294001	-	Hattiesburg	07/31/79	4.8	5.0	10	11	1.5	0.9	400	0.4	1.1	9	0	10	0	0	37	8	4	5.6	50 44L
USGS	4	312053-088560301	1050-1192	Catahoula	09/01/55	5.3	8.5	9	-	2.0	3.0	0	2.0	1.0	-	0.2	-	-	-	60	-	8	5.7	64
USGS	5	312105-088562701	628-728	Catahoula	09/01/55	43	5.0	111	-	1.6	1.3	540	0.2	1.4	-	0.2	-	-	-	157	-	4	7.6	200
USGS	6	312055-088562701	696-736	Catahoula	08/22/78	150	100	130	12	29	14	11000	2.3	3.0	30	0.1	-	-	-	447	110	44	6.7	826
USGS	MRIH-11D	312036-088294005	910-930	Catahoula	11/27/79	3600	4700	1580	20	-	37	24000	23	23	20	1.6	3000	13	0.35	9920	1300	190	7.5	13000 15000L
USGS	MRIH-11C	312036-088294004	1580-1610	Cook Mountain	11/26/79	2600	3100	1080	2.7	17	37	300	9.1	24	30	4.9	3100	11	0.92	6570	900	130	9.6	10500 11600L
USGS	MRIH-11B	312036-088294003	2525-2565	Wilcox	11/20/79	6600	9100	1070	19	-	55	9900	47	36	40	0.9	3100	90	1.9	17100	880	340	7.4	24000 27000L
USGS	MRIH-11A	312036-088294002	4206-4226	Wilcox	11/16/79	49000	60000	190	15	-	1500	100000	620	180	950	0.3	3600	340	0.57	107000	160	6700	6.9	80000 130000L

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MISSISSIPPI STUDY AREA
APPENDIX C-3
TABLE C-3.3 (PAGE 2 OF 3)
SELECTED CHEMICAL ANALYSES OF GROUND WATER IN VICINITY OF CANDIDATE DOMES
(Analyses reported in milligrams per liter except as noted.)

Data Source	Well	USGS Identifier	Sample Interval (ft)	Aquifer	Date of Collection	Sodium dissolved (as Na)	Chloride dissolved (as Cl)	Bicarbonate (as HCO$_3$)	Silica dissolved (as SiO$_2$)	Sulfate dissolved (as SO$_4$)	Calcium dissolved (as Ca)	Iron, Total Recoverable (ug/l as Fe)	Magnesium dissolved (as Mg)	Potassium dissolved (as K)	Manganese dissolved (ug/l as Mn)	Fluoride dissolved (as F)	Boron dissolved (ug/l as B)	Bromide dissolved (as Br)	Iodide dissolved (as I)	Dissolved Solids (Residue at 180°C)	Alkalinity (as CaCO$_3$)	Hardness (as CaCO$_3$)	pH (s.u.)	Specific Conductance (Micromhos)
USGS	18	311056- 88551201	566- 576	Miocene	06/21/79	98	85	130	20	14	4.4	400	1.4	2.1	20	0.1	-	-	-	312	110	17	7.8	480
USGS	24A	310956- 88552101	626- 666	Miocene	09/16/64	202	244	164	20	23	140	100	3.2	3.8	-	0.3	-	-	-	595	-	-	7.5.	1090
USGS	22	310956- 88550701	460	Miocene	05/27/64	154	148	148	18	16	2.6	30	0.1	0.4	-	0.1	0	-	-	380	-	7	7.9	742
USGS	20A	311044- 88553401	490- 550	Miocene	02/19/76	190	230	153	18	26	14	90	3.9	3.4	-	0.4	-	-	-	540	125	51	7.4	830
USGS	36	311157- 88590501	790- 810	Miocene	11/04/69	730	655	478	12	25	17	1600	1.8	5.9	-	1.0	-	-	-	1920	-	50	8.1	3430
USGS	35B	311150- 89014501	1050- 1090	Miocene	06/15/72	180	140	249	13	0.2	1.3	160	0.2	1.5	-	-	-	-	-	460	204	4	7.8	858
USGS	35A	311150- 89014501	1050- 1090	Miocene	06/29/69	176	137	-	4.4	0	0	0	0	0	-	0.4	-	-	-	442	198	-	8.4	-
USGS	33	311017- 89044901	570- 580	Miocene	11/08/79	36	4.9	110	22	11	7.0	800	2.1	3.4	90	0.1	40	0	.07	153	90	26	7.3	210
USGS	21A	310510- 89030401	700	Miocene	06/15/65	61	9.3	144	28	6.8	1.1	700	1.3	0.9	-	0.4	-	-	-	192	-	8	7.1	278
USGS	21B	310510- 89030401	700	Miocene	11/22/67	63	11	146	8.2	8.2	1.2	0	0	0.7	-	0.3	-	-	-	183	120	3	7.2	271
USGS	21C	310510- 89030401	700	Miocene	8/22/78	65	10	140	31	7.5	1.2	100	0.2	1.1	0	0.2	-	-	-	189	110	4	9.0	280
USGS	MCCG- 1wa	310858- 89000001	-	Citronelle	4/12/79	4.8	6.5	11	22	1.3	2.1	400	0.8	1.8	10	0	6	0.1	0	48	9	9	5.7	50 46L.
USGS	MCCG- 1	310858- 89000002	Open Hole	Caprock	10/02/79	4600	6700	260	23	2400	550	2400	72	19	80	1.3	2000	13	0.31	16500	210	1700	7.1	22500 230000L.
USGS	MCCG- 2wa	311107- 88595801	204 244	Hattiesburg	03/27/79	32	3.3	100	35	4.0	7.1	700	1.4	1.7	70	0.1	30	0	.01	140	82	24	8.8	175 184L.
USGS	MCCG- 2	311107- 88595802	2666- 2676	Kosciusko	09/27/79	41000	64000	240	8.9	580	390	85000	600	100	200	0.3	4000	99	7.9	107000	200	3600	7.1	85000 134000L.
USGS	MCCH- 3D	310553- 88594205	1221- 1251	Hattiesburg/ Catahoula	06/13/79	660	670	420	12	110	9.2	300	1.0	5.6	10	3.2	1400	1.7	0.03	1680	340	27	8.2	800 3020L.
USGS	MCCH- 3wa	310553- 88594201	306- 346	Hattiesburg	04/10/79	21	3.0	46	64	1.7	0.3	1300	0.3	0.5	10	0	-	0	0	115	38	3	6.5	90 93L.
USGS	MCCH- 3C	310553- 88594206	1795- 1838	Catahoula	10/08/79	56000	73000	310	16	2300	290	28000	150	160	200	1.2	2600	86	0.86	130000	250	1300	6.9	80000 150000L.
USGS	MCCH- 3A	310553- 88493202	3068- 3098	Cook Mountain	10/05/79	73000	120000	78	3.9	2600	410	27000	440	260	1000	0.8	5000	220	8.7	195000	64	2900	8.1	80000 200000L.
USGS	MCCH- 3B	310553- 88594203	3450- 3490	Kosciusko	10/22/79	80000	110000	70	0.8	1600	510	21000	520	320	-	0	1000	230	8.2	20600	57	3500	8.4	80000 220000L.

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APPENDIX C-3
TABLE C-3.3 (PAGE 3 OF 3)
SELECTED CHEMICAL ANALYSES OF GROUND WATER IN VICINITY OF CANDIDATE DOMES
(Analyses reported in milligrams per liter except as noted.)

Data Source	Well	USGS Identifier	Sample Interval (ft)	Aquifer	Date of Collection	Sodium dissolved (as Na)	Chloride dissolved (as Cl)	Bicarbonate (as HCO_3)	Silica dissolved (as SiO_2)	Sulfate dissolved (as SO_4)	Calcium dissolved (as Ca)	Iron, Total Recoverable (ug/l as Fe)	Magnesium dissolved (as Mg)	Potassium dissolved (as K)	Manganese dissolved (ug/l as Mn)	Fluoride dissolved (as F)	Boron dissolved (ug/l as B)	Bromide dissolved (as Br)	Iodide dissolved (as I)	Dissolved Solids (Residue at 180°C)	Alkalinity (as $CaCO_3$)	Hardness (as $CaCO_3$)	pH (s.u.)	Specific Conductance (Micromhos)
										LAMPTON														
USGS	150	311105- 89440001	240- 250	Hattiesburg	08/24/78	14	9.2	81	16	8.5	17	500	3.3	3.0	40	0.1	-	-	-	154	66	56	6.5	175

L - Laboratory measurement

T - Total

D - Dissolved

M - Maximum detectable by instrument

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MISSISSIPPI STUDY AREA

APPENDIX C-3

TABLE C-3.4

GAS ANALYSIS OF SELECTED WELLS

Well No.	Hydrogen	Methane	Ethane	Propane	IsoButane
MH-4A	9,000	213,000	5,800	0	0
MH-4C	3,200	216,000	5,900	0	0
MH-7A	128,000	275,000	40,900	0	0
MH-7B	10,100	205,000	10,300	0	0
MH-8C	128,000	275,000	40,900	0	0
MRIH-11B	128,000	278,000	40,900	0	0
MRIH-11C	60,500	134,000	0	0	0

All values reported as parts per million

T-1698-0

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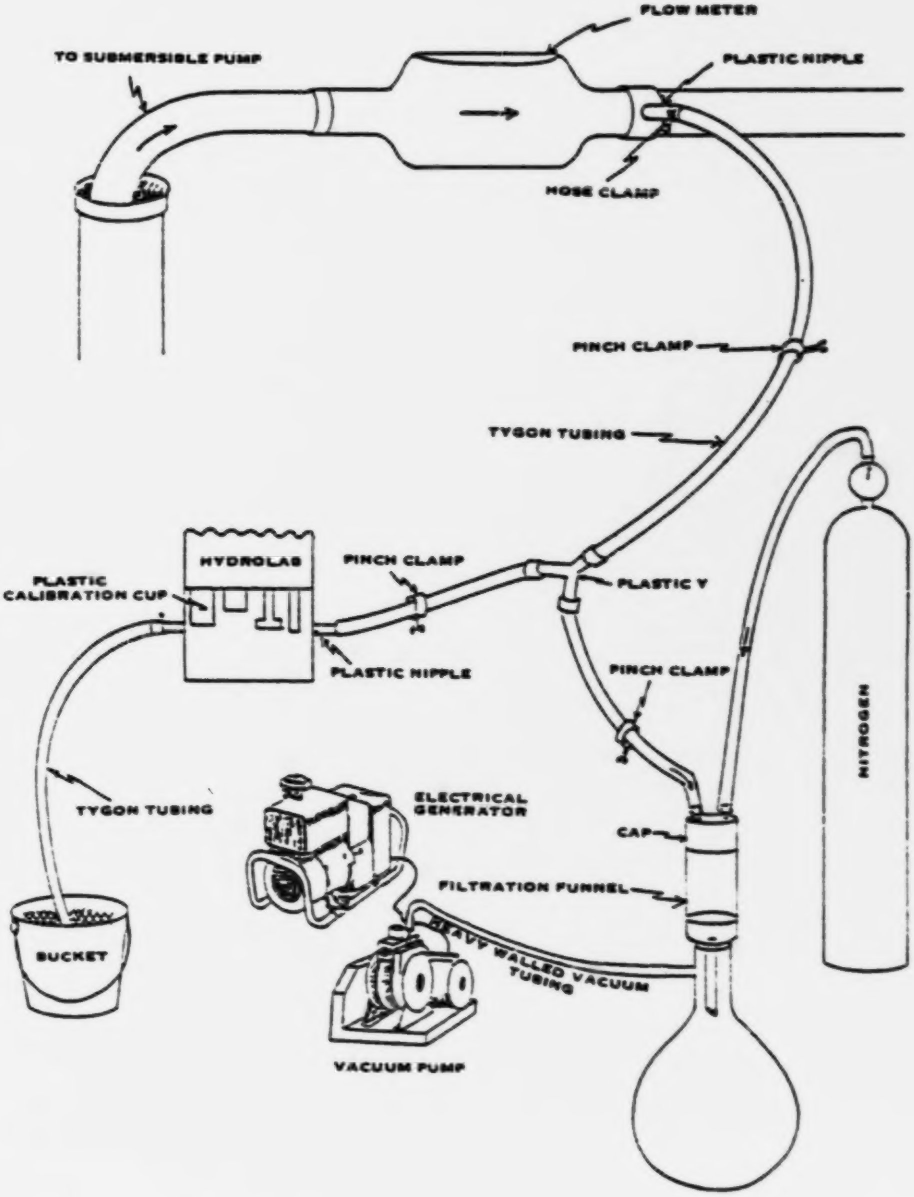
FLOW METER
TO SUBMERSIBLE PUMP
PLASTIC NIPPLE
HOSE CLAMP
PINCH CLAMP
TYGON TUBING
HYDROLAB
PINCH CLAMP
PLASTIC CALIBRATION CUP
PLASTIC Y
PLASTIC NIPPLE
PINCH CLAMP
NITROGEN
TYGON TUBING
ELECTRICAL GENERATOR
CAP
FILTRATION FUNNEL
BUCKET
HEAVY WALLED VACUUM TUBING
VACUUM PUMP

NOT TO SCALE

PREPARED ______ DATE ____
REVISED ______ DATE ____
REVISED ______ DATE ____
APPROVED ______ DATE ____
T-1188-2

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX C-3
INITIAL WATER QUALITY APPARATUS FOR SAMPLING UNDER ANAEROBIC CONDITIONS
JOB NO. MV9700 FIGURE C-3.1

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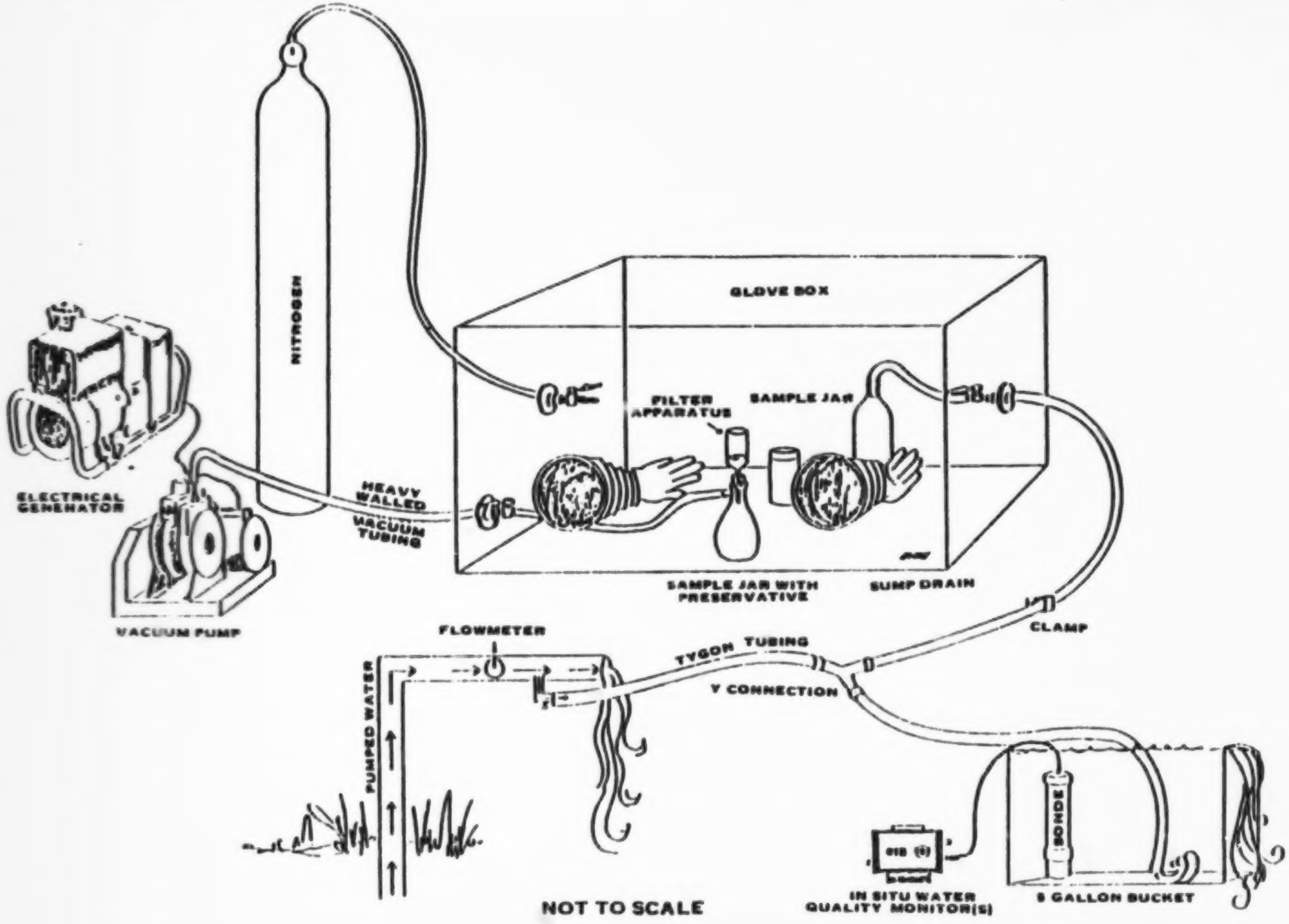
AF 12338 B


NITROGEN
GLOVE BOX
FILTER APPARATUS
SAMPLE JAR
ELECTRICAL GENERATOR
HEAVY WALLED VACUUM TUBING
VACUUM PUMP
SAMPLE JAR WITH PRESERVATIVE
SUMP DRAIN
FLOWMETER
TYGON TUBING
CLAMP
Y CONNECTION
PUMPED WATER
SONDE
NOT TO SCALE
IN SITU WATER QUALITY MONITOR(S)
5 GALLON BUCKET

PREPARED ________ DATE ________
REVISED ________ DATE ________
REVISED ________ DATE ________
APPROVED ________ DATE ________
T-1189-1

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA, GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX C-3
MODIFIED WATER - QUALITY APPARATUS FOR SAMPLING UNDER ANAEROBIC CONDITIONS
JOB NO. MV9700
FIGURE NO. C-3.2

FIGURE NO. C-3.2

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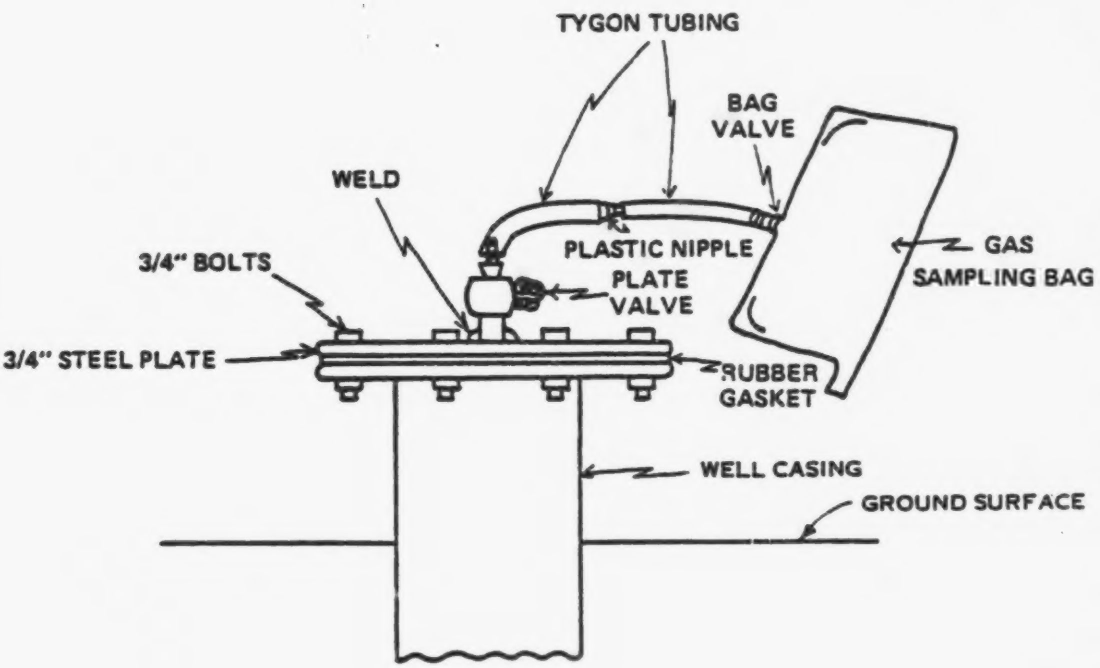
TYGON TUBING
BAG VALVE
WELD
PLASTIC NIPPLE
GAS SAMPLING BAG
3/4" BOLTS
PLATE VALVE
3/4" STEEL PLATE
RUBBER GASKET
WELL CASING
GROUND SURFACE

NOT TO SCALE

PREPARED ____ DATE ____
REVISED ____ DATE ____
REVISED ____ DATE ____
APPROVED ____ DATE ____
T-1187-1

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX C-3
GAS - SAMPLING APPARATUS
JOB NO: MV9700 FIGURE C-3.3

BEST DOCUMENT AVAILABLE

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APPENDIX C-3

REFERENCES

Franson, Mary A., ed., 1971, Standard methods for the examination of water and wastewater, 13th edition: American Public Health Association, Washington, D.C.

U.S. Environmental Protection Agency, 1971, Methods for chemical analysis of water and wastes: Cincinnati, Ohio, USEPA.

MISSISSIPPI STUDY AREA

APPENDIX C-4

FLOOD PLAIN DELINEATION

RICHTON SALT DOME

Computer analysis was performed only on the Pine Branch watershed at Richton Salt Dome because it drains approximately half the dome site and has the highest flood potential because of its developed flood plain. Backwater effects from Thompson Creek are insignificant at the site in comparison to the probable-maximum flood levels because of site drainage alone.

Probable-maximum precipitation (PMP) was determined for the Pine Branch watershed. The drainage area of this watershed is 10.8 km^2 (4.2 mi^2). A design storm of 6 hours was chosen and the corresponding PMP value for 26 km^2 (10 mi^2) or less taken from Schneider and Riedel (1978). The PMP was determined to be 813 mm (32 in). Typical PMP details such as storm configuration, maximizations procedures, time distribution, orographic effects, storm centering, seasonal effects, antecedent storm sequences, etc., were not analyzed separately.

The hydrologic response characteristics that needed to be identified included absorption capability of soils and times of concentration of hydrographs for subwatersheds. The absorption capability of soils in the watersheds was estimated through the SCS Soil Curve Number. A design value of 80 was chosen as a conservative estimate for pasture, meadow and forest land. The initial soil condition was assumed to be saturated. Times of

[redacted]

hydrograph concentration were calculated using standard methods (SCS, TR-55, 1975). Eight cross sections were selected on Pine Branch for use in the computations. Incremental drainage areas and flood plain lengths between cross sections were measured from USGS 7.5 minute quadrangle maps. Each cross-section was rated at incremental elevations for cross-sectional area and discharge, assuming constant slope between 3-meter (10-ft) contours and solving the Chezy-Manning equation for uniform flow:

$$Q = \frac{149}{n} \quad AR^{2/3} \quad S^{1/2}$$

where: Q = discharge, in units of length cubed per unit time

n = Manning's "n", (roughness coefficient)

A = cross-sectional area, in units of length squared

R = hydraulic radius, in units of length

S = energy gradeline slope, in units of length per unit length (assumed equal to stream bed slope).

A conservative value of 0.1 was assumed for Manning's "n" in the computations.

Cross-section data were input to SCS TR-20 (SCS, TR20, 1965) Flood Routing Computer Program for computation of peak discharges. Runoff hydrographs were computed at each section based on PMP and estimated hydrologic response chracteristics of the watershed. Resultant hydrographs were routed downstream and added together using the SCS Convex Routing Method and floodplain lengths.

The stream backwater profile for the PMF was computed using the Army Corps of Engineers HEC-2 Surface Water Profile Program (U.S. Army Corps of Engineers, 1976). This method applies Bernoulli's Theorem and Manning's frictional loss equation to solve for the total energy at each cross section. Cross-section data were input to HEC-2 for each stream reach, along with peak-discharge data derived by using TR-20. These discharges were assumed to be steady-state discharges at each cross section. The program generated flood elevations at each cross section using the input data. The area inundated by the PMF was determined by interpolating between cross sections.

Flood plain delineation for the minor tributaries that drain the remainder of the Richton Salt Dome site was estimated by making a graphical plot of peak discharge versus drainage area of the PMF hydrographs developed for the Pine Branch subwatersheds. Twenty cross sections were chosen in five sub-watersheds and drainage areas calculated from USGS 7.5-minute topographic maps. Probable-maximum flood discharges for these cross sections were estimated from the plot. Normal depth was calculated at each cross section as a conservative estimate of probable-maximum flood stage. The flood plain was delineated by interpolating between cross-sections.

CYPRESS CREEK SALT DOME

Flood analysis for the Cypress Creek Salt Dome site was limited to that portion of the Cypress Creek headwaters upstream of the State Highway 29 bridge because Black Creek was too far downstream from the dome site to cause backwater effects. The drainage area above the bridge is 22 km^2 (8.5 mi^2).

A design storm of 6 hours was chosen and the corresponding PMP value for 26 km^2 (10 mi^2) or less taken from Schneider and Riedel (1978). The PMP was determined to be 813 mm (32 in). Typical PMP details such as storm configuration, maximization procedures, time effects, antecedent storm sequences, etc., were not analyzed separately.

The absorptive capacity of soils in the watershed was estimated through the SCS Soil Curve Number. A design value of 80 was chosen as a conservative estimate for pasture, meadow, and forest. Initial soil condition was assumed to be saturated. There were no other allowances for antecedent precipitation conditions.

The SCS TR-20 Flood Routing Computer Program was used to develop peak discharges for the PMF. The procedures used are similar to those used for Richton Salt Dome.

The stream backwater profile for the PMF was computed using the Army Corps of Engineers HEC-2 Surface Water Profile Program. Data for six cross sections were input to HEC-2, along with the peak discharge data derived by using TR-20. These discharges were assumed to be steady-state discharges at each cross section. The program generated flood elevations at each cross section using the input data. The area inundated by the PMF was determined by interpolating between cross sections.

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LAMPTON SALT DOME

Flood analysis for the Lampton Salt Dome site was limited to Elbow Branch and three minor tributaries of Upper Little Creek. The Pearl River is too far downstream to cause backwater effects at the dome site. The drainage area of Elbow Branch watershed is 3.6 km^2 (1.4 mi^2). The drainage areas of the three unnamed tributaries to Upper Little Creek are 0.77, 0.88, and 1.47 km^2 (0.30, 0.34, and 0.57 mi^2).

A design storm of 6 hours was chosen and the corresponding PMP value for 26 km^2 (10 mi^2) or less was taken from Schneider and Riedel (1978). The PMP was determined to be 813 mm (32 in). Typical PMP details such as storm configuration, maximization procedures, time effects, antecedent storm sequences, etc., were not analyzed separately.

The absorptive capacity of soils in the watershed was estimated through the SCS Soil Curve Number. A design value of 80 was chosen as a conservative estimate for pasture, meadow, and forest. Initial soil condition was assumed to be saturated. There were no other allowances for antecedent precipitation conditions.

The SCS TR-20 Flood Routing Computer Program was used to develop runoff hydrographs for the PMF. The procedures used were similar to those used for Richton Salt Dome.

The backwater profile for the PMF on Elbow Branch was computed using the Army Corps of Engineers HEC-2 Surface Water Profile Program. Data for 15 cross sections were input to HEC-2, along with the peak-discharge data derived by using TR-20. These discharges were assumed to be steady-state discharges at each cross section. The program generated flood elevations at each cross section by using the input data. The area inundated by the PMF was determined by interpolating between cross sections.

Flood delineation for the minor streams that drain the remainder of the Lampton Salt Dome site was estimated by using procedures similar to those for Richton Dome. Probable-maximum flood discharges for cross sections within each subwatershed were varied by drainage area. Normal depths were calculated at each cross section as a conservative estimate of probable maximum flood stage. The flood plain was delineated by interpolating between cross sections.

MISSISSIPPI STUDY AREA

APPENDIX C-4

REFERENCES

Schreider, L. C. and J. T. Riedel; 1978; Probable Maximum Precipitation Estimates, United States East of the 105th Meridian; Hydrometeorological Report No. 51, U.S. Department of Commerce, National Oceanic and Atmospheric Administration; U.S. Department of the Army, Corps of Engineers.

Soil Conservation Service, 1975, Urban Hydrology for Small Watersheds: U.S. Department of Agriculture Soil Conservation Service Engineering Division, Technical Release No. 55.

Soil Conservation Service, 1965, Computer Program for Project Formulation, Hydrology: Soil Conservation Service Technical Release No. 20, 18 p.

U.S. Army Corps of Engineers, 1976, Generalized Computer Program HEC-2, Water Surface Profiles: Hydrology Engineering Center, U.S. Army Corps of Engineers, 17 p.

APPENDIX D

Surface Geology

MISSISSIPPI STUDY AREA

APPENDIX D-1

REMOTE SENSING

Remote sensing studies in Mississippi were conducted by Dr. Roy Welch under contract to Law Engineering. These studies identified trends and anomalies in the lineament and drainage patterns in the Mississippi Salt Basin. These trends and anomalies were used to help interpret the structural stability in the study area and in the vicinity of the three candidate domes.

High-altitude color infrared photos, Landsat images, and USGS topographic maps were used to identify lineaments and drainage patterns in the study and near-dome areas. Dr. Welch's report is attached. The original report figures were reduced for presentation and, in some instances, modified slightly for clarification by Law Engineering personnel.

A list of the purchased Landsat imagery, NASA color infrared imagery, and U.S. Department of Agriculture low-altitude aerial photographs and the aerial photographs taken specifically for the Area Characterization study is presented (Table D-1.1).

MISSISSIPPI STUDY AREA

APPENDIX D-1

TABLE D-1.1 (Page 1 of 5)

AERIAL PHOTOGRAPHS AND IMAGERY

PURCHASED IMAGERY

1. Landsat

2 black and white prints, band 5, scale 1:250,000
2 black and white prints, band 7, scale 1:250,000
2 positive transparencies, band 5, scale 1:250,000
2 positive transparencies, band 7, scale 1:250,000 and
2 false color composites, bands 4, 5, 7, scale 1:250,000 of:

Path	Row	Scene	Date
23	38	8237115473500	1/28/76
24	38	8327215532500	1/29/76

3 black and white prints, band 7, scale 1:250,000 of:

Path	Row	Scene	Date
23	38	8274915354500	2/09/77
23	38	8233515480500	12/23/75
23	38	8117716014500	1/16/73

1 Black and white positive transparency, bands 5, 7, scale 1:3,369,000 of:

Path	Row	Scene	Date
23	38	8237115473500	1/28/76
23	38	8233515480500	12/23/75
23	38	8180715503500	10/08/74
24	38	8237215532500	1/16/73
24	38	8182615560500	

Computer enhanced imagery for the following:

Path	Row	Scene	Date
23	38	1840715503	10/08/74

MISSISSIPPI STUDY AREA

APPENDIX D-1

TABLE D-1.1 (Page 2 of 5)

AERIAL PHOTOGRAPHS AND IMAGERY

PURCHASED IMAGERY (Continued)

2. NASA

1 color infrared print, scale 1:120,000 of:

Mission	Roll	Frame
300	3	50 - 62
		65 - 74
		92 - 125
228	1	19 - 22
	16	78 - 119
		132 - 187

1 Color infrared film positive, scale 1:120,000 of:

Mission	Roll	Frame
228	1	12 - 22
	16	83 - 88
		90 - 94
		102 - 106
		109 - 113

3. USGS Orthophotoquads

8 black and white transparencies for stereocoverage, scale 1:80,000 and

8 black and white diazo prints, scale 1:24,000 of:

New Augusta NE, NW, SE, SW and

Beaumont NE, NW, SE, SW topographic quadrangles

[redacted]

405

MISSISSIPPI STUDY AREA

APPENDIX D-1

TABLE D-1.1 (Page 3 of 5)

AERIAL PHOTOGRAPHS AND IMAGERY

PURCHASED IMAGERY (Continued)

4. United States Department of Agriculture

1 black and white, low altitude print, scale 1:20,000 of:

Cypress Creek Dome Vicinity

Mission	Flight Line	Frame	Date
DML	2LL	14 - 25	2/17/70
		59 - 71	
		97 - 108	
		141 - 151	
	3LL	263 - 267	3/15/70
	4LL	221 - 230	
	3H	126 - 136	4/28/52
		178 - 190	
	4H	20 - 32	4/29/52
		66 - 67	
		118 - 122	

Lampton Dome Vicinity

Mission	Flight Line	Frame	Date
CLQ	1LL	162 - 167	2/10/70
CJS	1FF	11 - 28	12/15/64
		46 - 63	
	2FF	9 - 27	
		45 - 63	
		81 - 98	
		115 - 133	
		150 - 167	
	3K	120 - 132	6/16/52
	4K	1 - 10	
		18 - 36	
		52 - 71	
		86 - 103	
		118 - 136	
		152 - 169	
	3H	40 - 45	4/28/52

MISSISSIPPI STUDY AREA

APPENDIX D-1

TABLE D-1.1 (Page 4 of 5)

AERIAL PHOTOGRAPHS AND IMAGERY

PURCHASED IMAGERY (Continued)

Richton Dome Vicinity

Mission	Flight Line	Frame	Date
DML	2LL	31 - 39	2/17/70
		46 - 54	
		114 - 121	
		130 - 133	
	3LL	247 - 253	3/15/70
	4LL	206 - 214	
	3H	145 - 148	4/28/52
		163 - 170	
	4H	7 - 15	4/29/52
		83 - 91	
		101 - 109	
		175 - 181	

IMAGERY FLOWN FOR THE AREA CHARACTERIZATION STUDY

black and white images on 5 inch film format strips, scale 1:24,000 and

color images on 70 MM film format strips, scale 1:48,000

Each strip covers an area approximately 2 miles by 8 miles and

Each set of strips covers an area of approximately 64 square miles** centered over a dome.

T-1697D-0

---

*To convert to kilometers, multiply by 1.609.

**To convert to square kilometers, multiply by 2.590.

MISSISSIPPI STUDY AREA

APPENDIX D-1

TABLE D-1.1 (Page 5 of 5)

AERIAL PHOTOGRAPHS AND IMAGERY

IMAGERY FLOWN FOR THE AREA CHARACTERIZATION STUDY (Continued)

Cypress Creek Dome Vicinity

6 strips	Q-Analog black and white (Negative and print)
6 strips	Analog/Contour black and white (Negative and print)
6 strips	8-Level color (Negative and print)

Lampton Dome Vicinity

6 strips	Analog black and white (Negative and print)

Richton Dome Vicinity

6 strips	Q-Analog black and white (Negative and print)
6 strips	Analog/Contour black and white (Negative and print)
6 strips	8-Level color (Negative and print)

Report to LETCO
3/5/79

REMOTE SENSING STUDY OF LINEAMENT/DRAINAGE PATTERNS IN THE MISSISSIPPI BASIN

R. Welch[1]

INTRODUCTION

The primary objectives of this study have been to: 1) map the lineaments and drainage patterns in the Mississippi Basin from Landsat images and high-altitude color infrared aerial photographs at scales compatible with those employed for similar studies of the North Louisiana and Northeast Texas Basins; and 2) provide a basis for the assessment of the stability of the Richton, Lampton and Cypress Creek salt domes from the lineament/drainage patterns. In order to accomplish these tasks the study has involved the preparation of regional and dome specific maps at both 1:250,000 and 1:100,000 scales (Fig. 1).

REGIONAL STUDY

Landsat MSS color composite and black-and-white images in bands 5 and 7 have been employed to prepare 1:250,000 scale lineament and drainage overlays for two Landsat scenes of the Mississippi Basin (Fig. 2, Table 1). These images were recorded in January, 1976 at a time when the underlying terrain was not masked by deciduous vegetation and there was sufficient runoff to facilitate the delineation of drainage patterns. Additional analyses of 1:120,000 scale color infrared air photographs recorded in January 1973 were employed to construct regional lineament and drainage maps at 1:100,000 scale.

---

[1] This project was undertaken by Joe Wadsworth, Terry Allison, and Dana Sotherlund under the direction of Dr. Roy Welch.

TABLE 1

IMAGE DATA

Images	Date	Type
Landsat E-2371-15473	1/28/76	Bands 5 and 7
Landsat E-2372-15532	1/29/76	Bands 5 and 7

NASA/MSC High Altitude Color Infrared Photographs - January 1973[1]

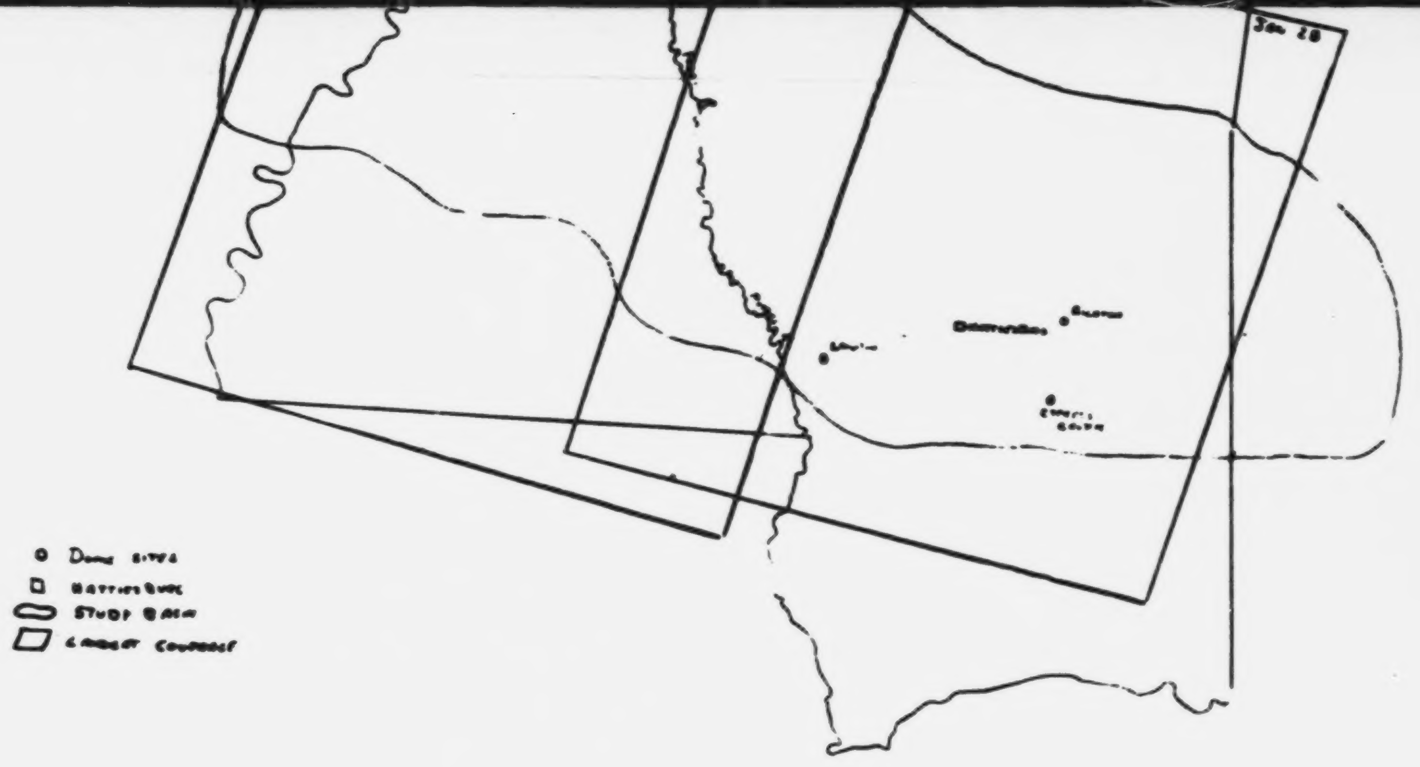
Imagery	Format		Number of Images
16-0012 to 16-0018	Print		7
16-0019 to 16-0022	Transparency		4
16-0078 to 16-0082	Print		5
16-0083 to 16-0094	Transparency		12
16-0095 to 16-0101	Print		7
16-0102 to 16-0106	Transparency		5
16-0107 to 16-0108	Print		2
16-0109 to 16-0113	Transparency		5
16-0114 to 16-0119	Print		6
16-0132 to 16-0186	Print		55
		Total	108

---

[1] It must be noted that both paper prints and film transparencies were employed. The superior interpretability of the transparencies may have influenced the detail represented on the final maps.

114

N
Jan 17
Jan 28


Jan 28
Dome sites
Hattiesburg
Study Basin
Landsat Coverage

411A

NOTE

ORIGINAL SCALE WAS 1:100,000. FIGURE REDUCED BY LAW ENGINEERING PERSONNEL TO SCALE SHOWN.

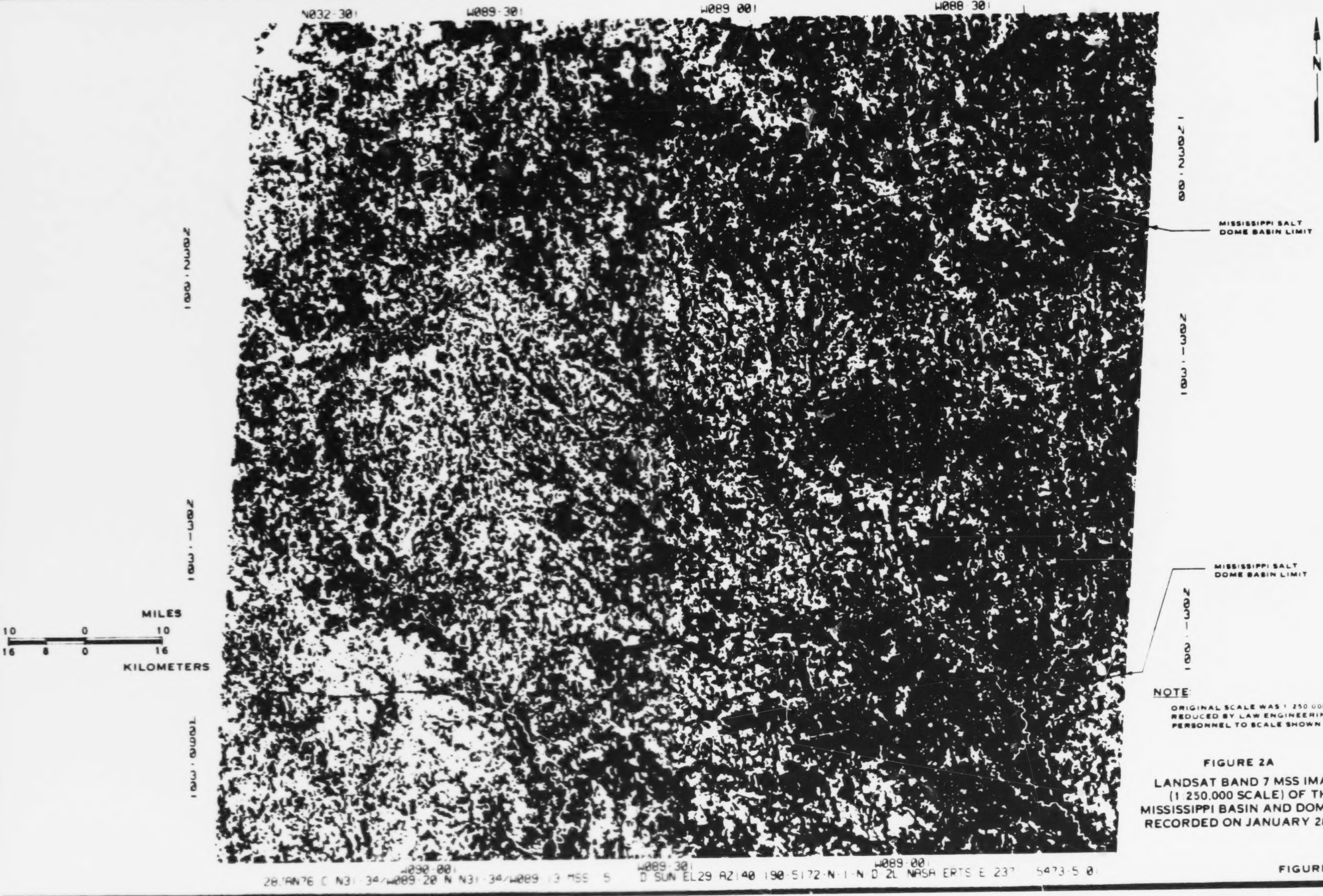
20 0 20 MILES
30 0 30 KILOMETERS

FIGURE 1 MISSISSIPPI BASIN STUDY AREA AND THE LOCATION OF RICHTON, CYPRESS CREEK AND LAMPTON SALT DOMES.

FIGURE 1

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

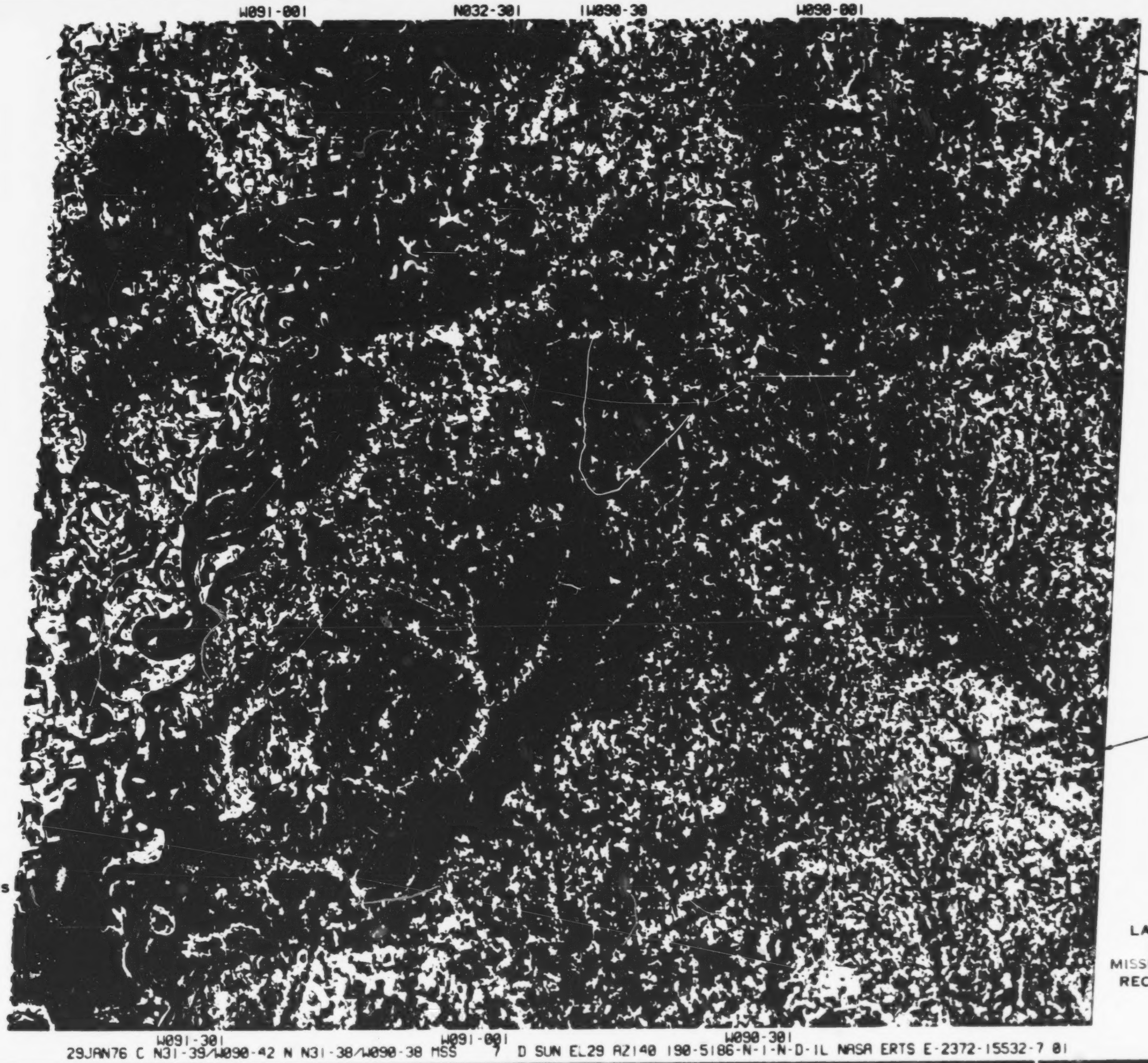

N032·30'
W089·30'
W089 00'
W088·30'
N
N032·00'
MISSISSIPPI SALT DOME BASIN LIMIT
N031·30'
MISSISSIPPI SALT DOME BASIN LIMIT
N031·00'
N032·00'
N031·30'
MILES
10
0
10
16
8
0
16
KILOMETERS
W090·00'
W089·30'
W089·00'
28JAN76 C N31·34/W089·20 N N31·34/W089 13 MSS 5 D SUN EL29 AZ140 190·5172·N·1·N D 2L NASA ERTS E 237 5473·5 0
FIGURE 2A

NOTE:

ORIGINAL SCALE WAS 1 250 000 FIGURE REDUCED BY LAW ENGINEERING PERSONNEL TO SCALE SHOWN

FIGURE 2A

LANDSAT BAND 7 MSS IMAGE (1:250,000 SCALE) OF THE MISSISSIPPI BASIN AND DOME SITE RECORDED ON JANUARY 28, 1976


W091-001
N032-301
W090-30
W090-001
N032-30
N032-00
N031-30
N031-00
N032-00
N031-30
N031-00
W091-301
W091-001
W090-301
N
MILES
10
0
10
16
8
0
16
KILOMETERS
MISSISSIPPI SALT DOME BASIN LIMIT
MISSISSIPPI SALT DOME BASIN LIMIT

29JAN76 C N31-39/W090-42 N N31-38/W090-38 MSS 7 D SUN EL29 AZ140 190-5186-N-1-N-D-1L NASA ERTS E-2372-15532-7 01

NOTE

ORIGINAL SCALE WAS 1:250,000 FIGURE REDUCED BY LAW ENGINEERING PERSONNEL TO SCALE SHOWN

FIGURE 2B

LANDSAT BAND 7 MSS IMAGE (1:250,000 SCALE) OF THE MISSISSIPPI BASIN AND DOME SITE RECORDED ON JANUARY 29, 1976

FIGURE 2B

[redacted]

Lineaments

Regional lineament patterns in the Mississippi Basin were first delineated on Landsat 1:1,000,000 scale positive transparencies by two geologists using a Bausch & Lomb Zoom 70 viewing system mounted over a Richards high-intensity light table. Viewing magnifications ranged from 3.5 to 15x, with 3.5 to 5x preferred due to the larger field-of-view.

Each geologist independently analyzed the images, annotating the lineaments on clear plastic overlays registered to the individual transparencies. Based on the results of a pilot study, the criteria for lineament identification on the images were as follows:

1. topographic relief--ridges and valleys with definite linear orientation.
2. controlled drainage--straight stream segments, chains of lakes or ponds, abrupt changes in the course of rivers and streams.
3. distinct tonal contrasts--linear boundaries due to vegetative patterns, soil moisture, inc.

Of these criteria, topographic relief and controlled drainage were particularly important. The reliability of identification increased when more than one criterion was associated with the lineament. Once the analysis of a scene was complete the sets of overlays prepared by both geologists were superimposed in register for comparison. Lineaments on the overlays noted to be coincident or colinear were then transferred to a separate master overlay at 1:1,000,000 scale. Discrepancies between the geologists on any remaining lineaments were then resolved and those deemed worthy of inclusion in the final plots were also transferred to the master overlay.

The master overlay was then enlarged and fitted to control points plotted on a gridded Mylar base sheet of 1:250,000 scale containing the drainage networks transferred from USGS 1:250,000 scale maps of the area (see Drainage section). Composite maps at 1:250,000 scale of the lineaments and drainage are shown in Figs. 3 and 4.

Following the completion of the analyses of the Landsat images, 108 color infrared photographs at 1:120,000 scale (covering 9,900 mi^2) were studied stereoscopically by one of the geologists (Fig. 5). Lineaments were identified and then delineated on clear plastic overlays registered to the color infrared photographs. Next, these overlays were enlarged with the aid of a Saltzman projector and fitted to ground control (obtained from 1:24,000 and 1:62,500 scale USGS quadrangles) plotted on a gridded base sheet of 1:100,000 scale. The lineaments were then transferred to this base sheet to provide a detailed regional map at 1:100,000 scale. This map was subsequently reduced to 1:250,000 scale (Fig. 6).

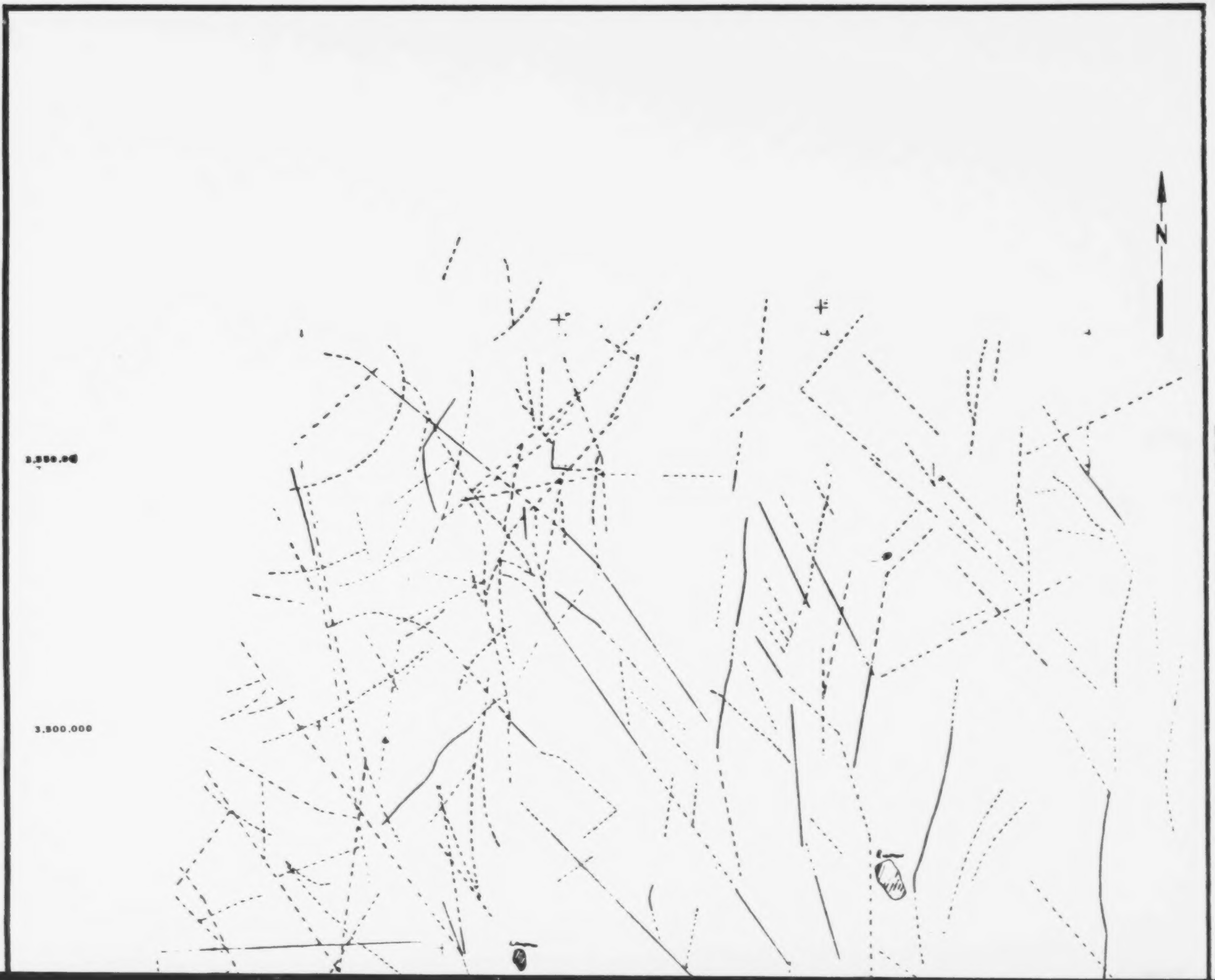
Drainage

In order to facilitate the evaluation of regional lineament and drainage patterns,a 1:250,000 scale map of the stream system was compiled. Materials employed for this task included the two Landsat scenes, six USGS 1:250,000 topographic maps for the same area, and 1:250,000 scale Mylar base sheets on which a 5 cm grid and control points identifiable on both maps and images were plotted (in UTM coordinates).

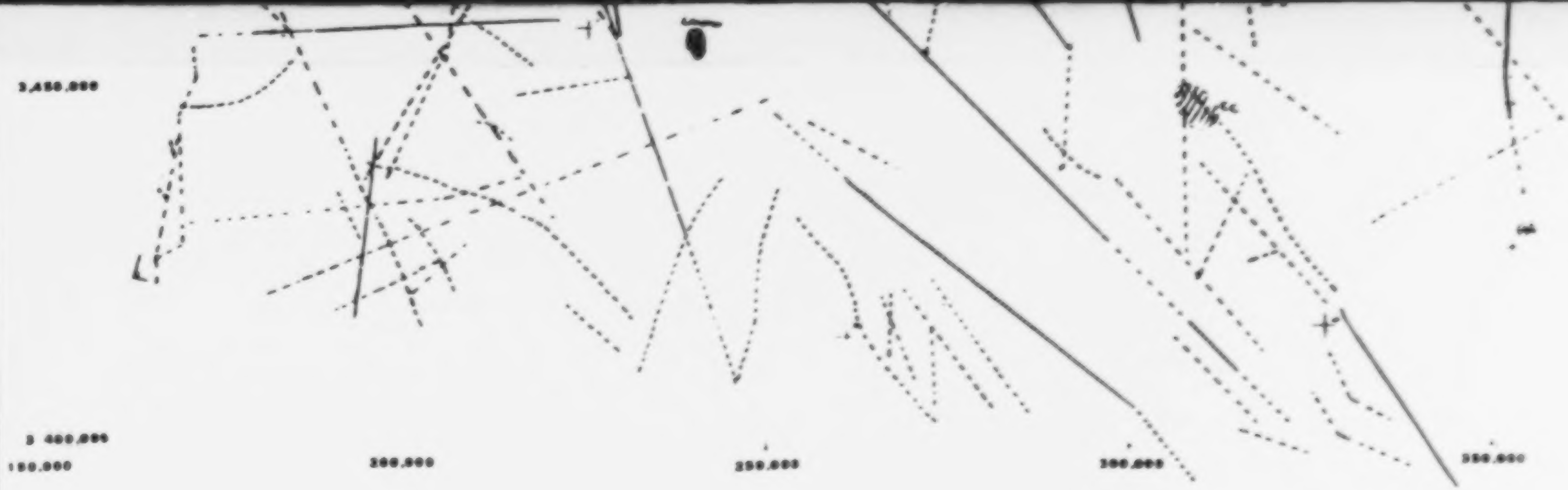
The drainage patterns were delineated for both scenes on the clear plastic overlays registered to the 1:1,000,000 scale band 7 positive transparencies and 1:250,000 scale paper prints. These overlays were then compared with the 1:250,000 USGS topographic maps of the same area Stream courses delineated on the Landsat overlays were traced from the 1:250,000 topographic

[redacted]

416


N
3,550,000
3,500,000

BEST DOCUMENT AVAILABLE


3,450,000
3 400,000
150,000
200,000
250,000
300,000
350,000

——— DEFINITE LINEAMENTS

– – – – – INDEFINITE LINEAMENTS

0 10 20 MILES
0 10 20 30 KILOMETERS

FIGURE 3 1:250,000 SCALE MAPS OF THE REGIONAL LINEAMENT AND DRAINAGE PATTERNS. CONTROL POINTS ARE NUMBERED (E.G. 14) AND UTM COORDINATES INDICATED IN THE MARGINS. THESE MAPS CAN BE APPROXIMATELY REGISTERED WITH THE LANDSAT IMAGE IN FIGURE 2A.

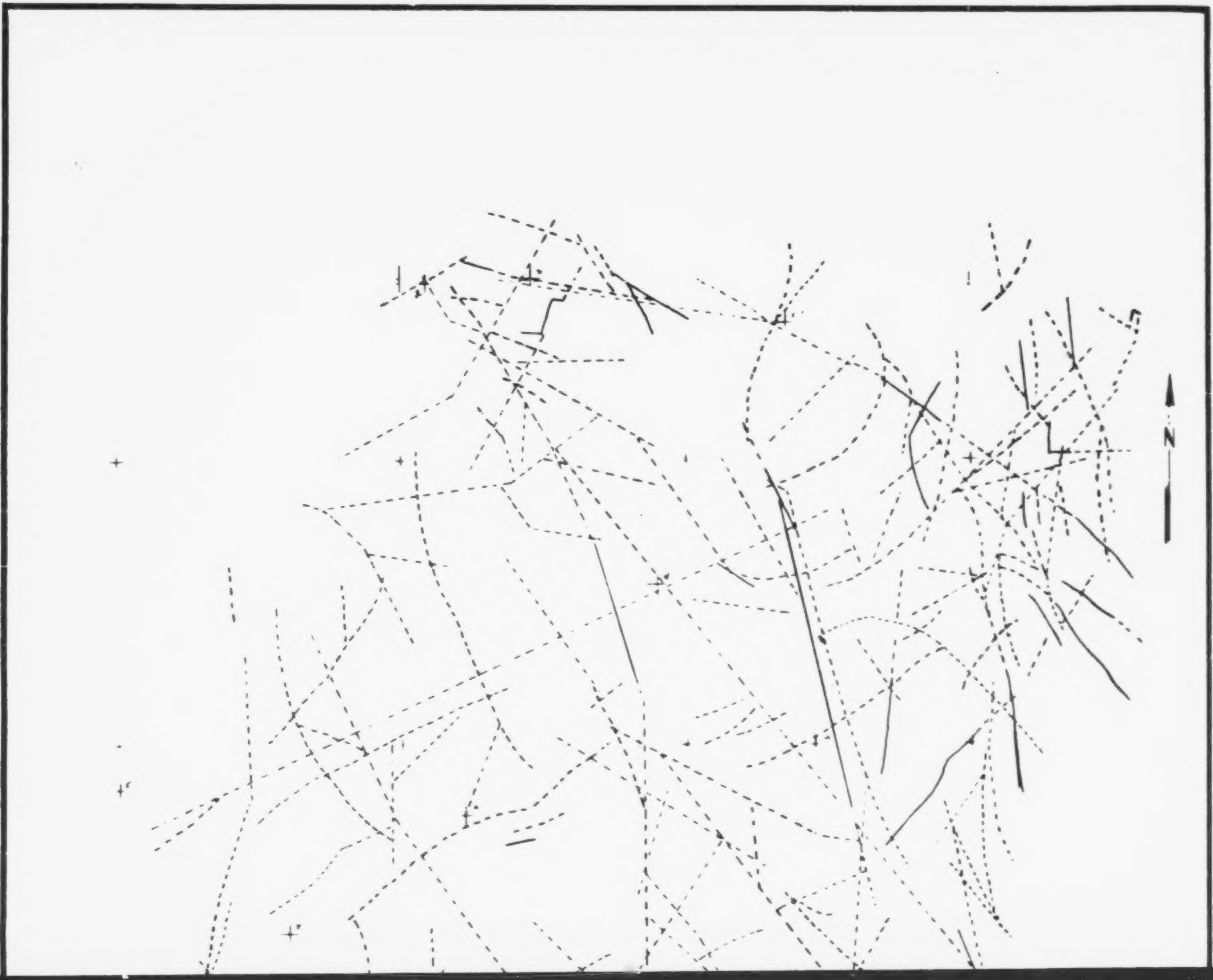
NOTE

ORIGINAL SCALE WAS 1:250,000 FIGURE REDUCED BY LAW ENGINEERING PERSONNEL TO SCALE SHOWN

416A

FIGURE 3

417



4171

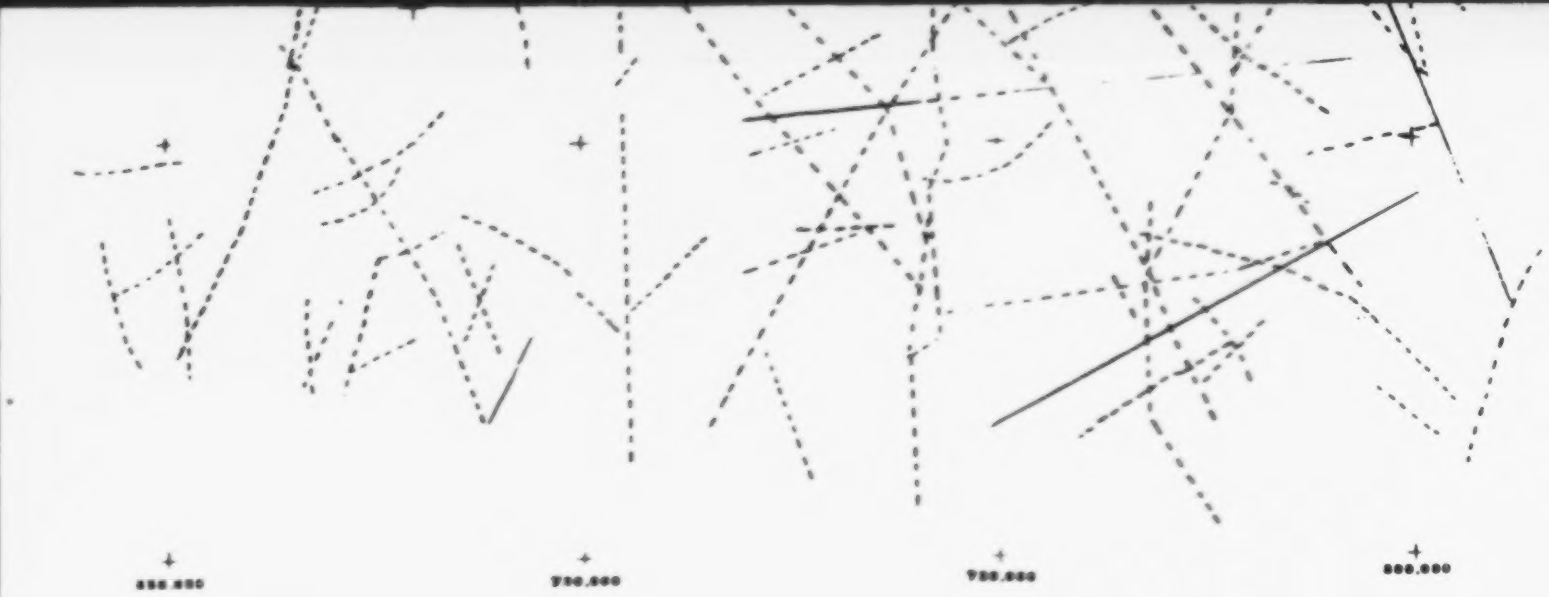

650,000
700,000
750,000
800,000
DEFINITE LINEAMENTS
INDEFINITE LINEAMENTS
0 10 20 MILES
0 10 20 30 KILOMETERS

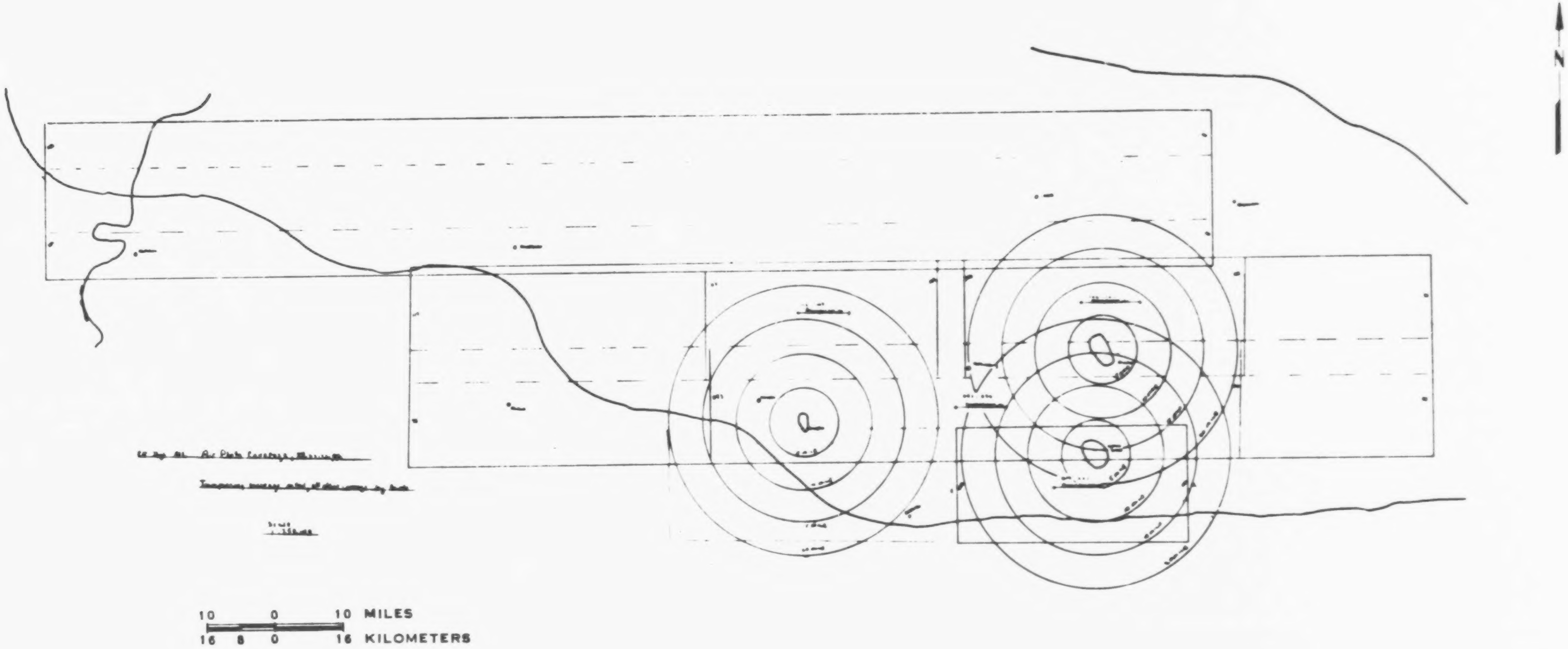
FIGURE 4 1:250,000 SCALE MAPS OF THE REGIONAL LINEAMENT AND DRAINAGE PATTERNS. THESE MAPS CAN BE APPROXIMATELY REGISTERED WITH THE LANDSAT IMAGE IN FIGURE 2B.

NOTE

ORIGINAL SCALE WAS 1:250,000 FIGURE REDUCED BY LAW ENGINEERING PERSONNEL TO SCALE SHOWN.

BEST DOCUMENT AVAILABLE

FIGURE 4

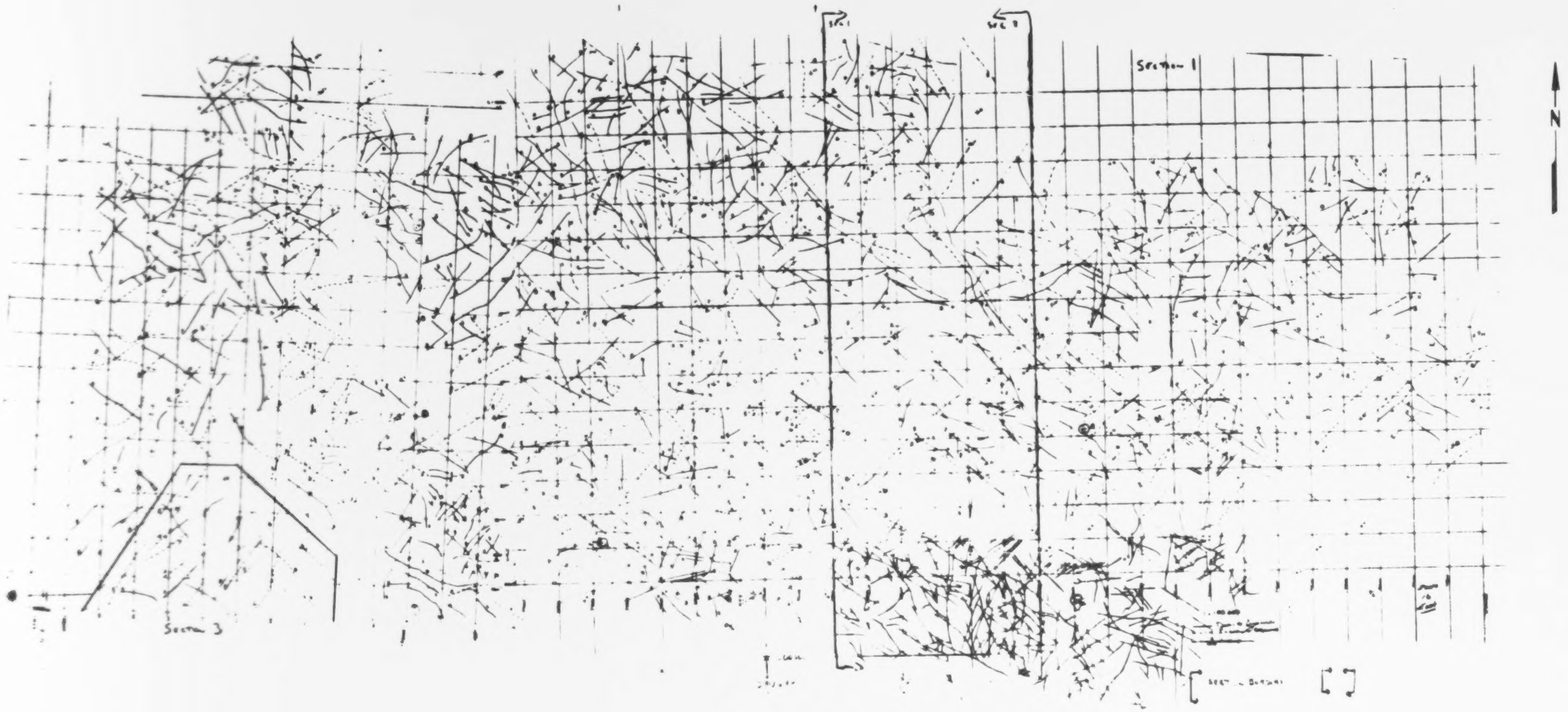


NOTE

ORIGINAL SCALE WAS 1:250,000. FIGURE REDUCED BY LAW ENGINEERING PERSONNEL TO SCALE SHOWN.

FIGURE 5 INDEX MAP AT 1:250,000 SCALE OF HIGH-ALTITUDE COLOR INFRARED PHOTOGRAPHIC COVERAGE OF THE STUDY AREA (PHOTO SCALE =1:120,000) FILM TRANSPARENCIES AVAILABLE FOR THE DOME SITES ONLY.

[redacted]



5 0 5 MILES
8 4 0 8 KILOMETERS

—— DEFINITE LINEAMENTS

- - - - - INDEFINITE LINEAMENTS

FIGURE 6 REGIONAL LINEAMENT MAP AT 1:250,000 SCALE BASED ON THE ANALYSIS OF THE COLOR INFRARED AERIAL PHOTOGRAPHS THIS MAP WAS COMPILED AT 1:100,000 SCALE AND SUBSEQUENTLY REDUCED TO 1:250,000 SCALE.

NOTE

ORIGINAL SCALE WAS 1:100,000. FIGURE REDUCED BY LAW ENGINEERING PERSONNEL TO SCALE SHOWN.

maps onto the gridded base sheets (at 1:250,000 scale). This procedure insured that the streams identified on the Landsat images were plotted in the correct planimetric position throughout their length, thus overcoming difficulties caused by tree canopies masking portions of the stream courses on the photographs. Final maps for the two Landsat scenes were drafted at 1:250,000 scale (Figs. 3 and 4). There is a narrow zone of sidelap between the two maps, facilitating their registration.

Lineaments identified on the Landsat images have also been transferred to these maps. Together, the 2 maps cover the full width of Mississippi and include the complete study area.

Conclusions from the Visual Analyses of the Landsat and Aircraft Images

Lineaments identified on the Landsat images exhibit a strong NW/SE orientation. On the eastern image, a weaker N-S mode is discernable. No other clear orientation sets are defined. Most long (> 25 miles) lineaments correspond to major trunk channels in the drainage system. These channels exhibit a northerly trend, suggesting a possible regional uplift to the northwest. This uplift may preferentially enhance the recognizability of structural features trending parallel to the drainage network.

In the north-central region of the project area, curved lineaments display a loosely concentric distribution suggesting local uplift. These lineaments may be related to the Jackson Dome, a major structural feature located in the same area. Cypress Creek Dome is crossed by two lineaments which intersect just outside the immediate dome area. Neither Richton nor Lampton Domes was crossed by a lineament. No definite relationships could be established between the positions of the domes and the regional distribution of the lineaments observed on the Landsat images.

[redacted]

Lineament identified from color infrared aerial photographs show a strongly bimodal orientation, with sets trending roughly NW/SE and NE/SW at an angle of about 80° to one another (Fig. 6). Lineaments of greater than average length predominantly belong to the NW/SE set, which is consistent with the lineament distribution observed on the Landsat images. The distinct bimodal orientation of short and intermediate-length lineaments (as observed in the aerial photographs) is not manifested in the orientation of the longer lineaments noted on the Landsat images, which suggests that this bimodality may be related to a separate origin or level of structural control.

Large variations in lineament density exist throughout the project area, but show no relationship to the locations of the 3 domes considered in the study. Long (40 mile) linear belts of low lineament density occur at several places in the project area, and may be due to obscurement of structural features by thick alluvial deposits.

In the west-central region of the project area, a set of concentrically distributed curved lineaments suggests a second local domal structure distinct from the presumed "Jackson Dome" structure mentioned earlier (Fig. ~~4~~6). This feature, centralized near control point (2), is about 15 miles in diameter.

While it is not possible to establish the precise origins of specific lineaments without ground investigations, some lineaments in the project area show characteristics of lateral and vertical fault movement. These may be related to scarp formation and the displacement of crosscutting lineaments.

Digitization and Computer Analyses of Lineament Patterns

The regional lineament map (Fig. 6) prepared from the interpretation of the color infrared aerial photographs is a uniform record of the lineament distribution throughout the study area. Consequently, it provides a basis for the quantitative assessment of the lineament patterns in southern Mississippi.

[redacted]

In order to quantitatively assess parameters such as orientation, number of lineaments/areal unit, cumulative length of lineaments/areal unit, and number of intersections/areal unit, a series of computer programs obtained from the Texas Water Development Board through the Texas Bureau of Economic Geology were applied. These programs take digital data in the form of x, y terrain coordinates of the end points of the lineaments and compute the desired parameters. Difficulties in obtaining listings, sample data and instructions, coupled with the requirement for an experienced programmer to modify the programs (FRACRUN, B) for the University of Georgia Cyber 74 computer system, delayed the quantitative analyses for several months.[1]

In order to accomodate limitations imposed by the programs (a maximum of 800 lineaments), the approximately 1700 lineaments on the 1:250,000 regional map (Fig. 6) were split into three groups. For each group the x, y coordinates of the end points of the lineaments were recorded on magnetic tape. Long curvilinear lineaments were divided into straight line segments to facilitate the analyses. Upon completion of the digital recording of the x, y terrain coordinates, these raw data were transferred from the tape to disk files at the computer center. A subprogram, LOADIT, was used to reformat the data to 2F5.0 format (e.g. +63774. + 23430.) and to store these reformated coordinates in a separate disk file, FRACIN. The reformatting procedure matches adjacent pairs of x, y coordinates to define the lineaments, and provides necessary control statments. FRACRUN, B was then accessed to process the data. The control statements required to accomplish these tasks are given in Table 2.

The following categories of output are obtained from FRACRUN, B.

---

[1] FRACRUN, B actually refers to a disk file containing the computer programs, FRACTR.

TABLE 2

CONTROL STATEMENTS FOR COMPUTER ANALYSIS OF LINEAMENTS ON THE CYBER 74 SYSTEM

```
GET, DATA FILE

GET, FRACRUN

CALL (LOADIT (INPUT = DATA FILE)).

SUBMIT, FRACRUN, B
```

1. Azimuths of lineaments in 10 degree increments.
2. Numbers of lineaments in 4 in^2 subareas of the map.
3. Cumulative length of lineaments (in miles) in 4 in^2 subareas of the map.
4. Number of lineament intersections in 4 in^2 subareas of the map.
5. Weighted arithmetic mean of azimuths in 4 in^2 subareas of the map (NE and NW quadrants).
6. Rose diagram (Calcomp plot).

Items 2-5 are computed using a moving average technique for 2 x 2 inch grid squares. Consequently, the output values plotted by the line printer are derived from a weighting procedure and, as such, do not represent the values for successive discrete 2 x 2 inch areas. In the practical sense, the output values are used to identify regions where numbers, lengths and intersections depart from "average" conditions.

Figures 7 and 8 portray cumulative length (density) and number of intersections per 4 in^2 area, and have been contoured/colored to facilitate interpretation. Each dome location is plotted at the center of a circle with an approximate 15 mile radius. For precise planimetric locations the 1:250,000 scale regional lineament map must be used. The predominant NW/SE and NE/SW orientations of the lineaments are illustrated by the rose diagrams in Fig. 9.

Regional Lineament Patterns

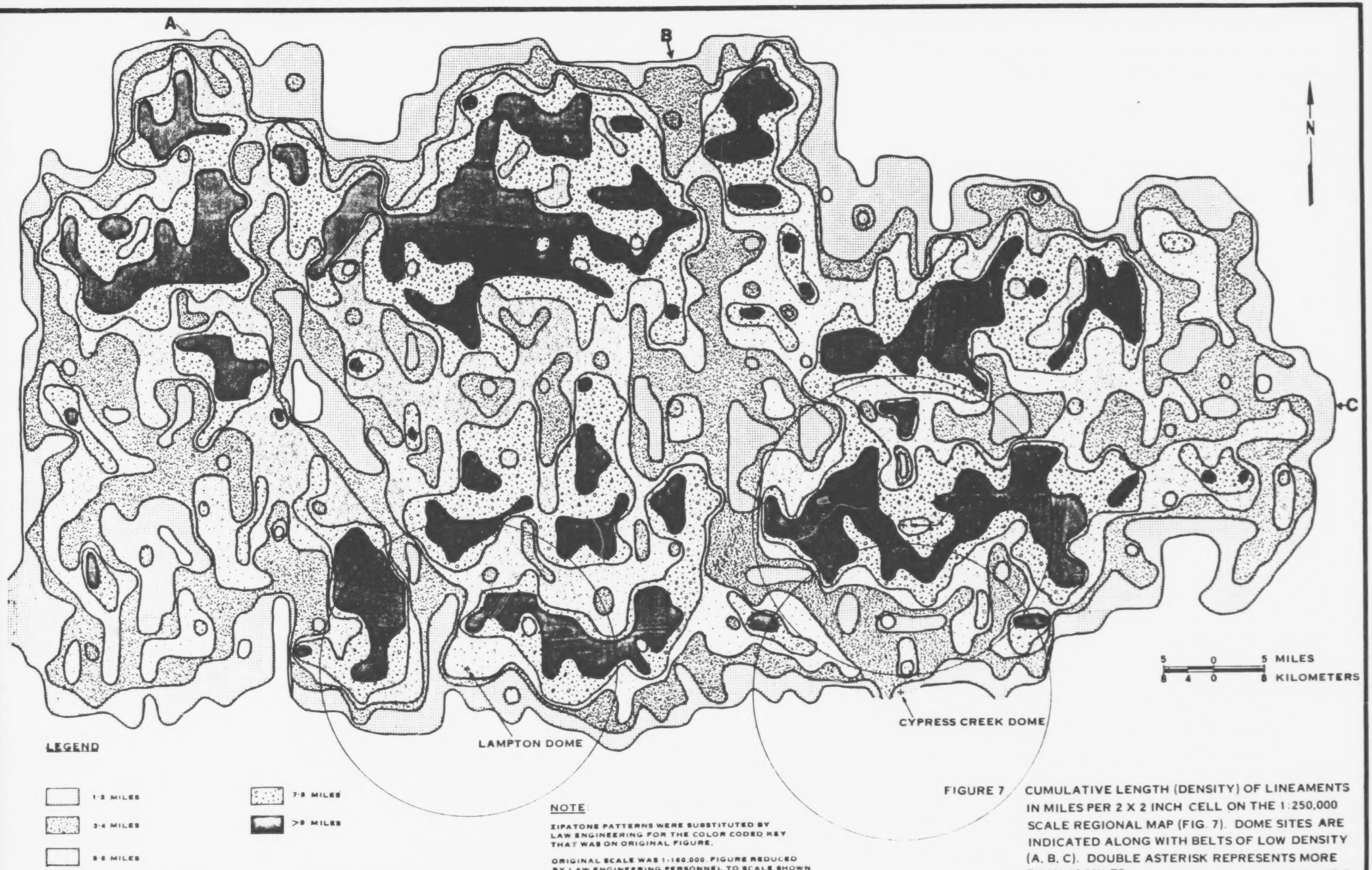
Lineament density (as inferred from cumulative length in miles) varies considerably. Two belts of low lineament density are oriented north-south across the study area (A and B in Fig. 7). These belts tend to correspond to the alluvial fill deposits of major stream courses which may deter identification of underlying lineaments. Few intersections are to be found in these belts (A and B in Fig. 8). A third and less distinct belt of low lineament density, denoted by "C" in Figs. 7 and 8, runs east-west through the study area. No definite explanation for this pattern can be given.

In general, there is fairly good correspondence between areas of high lineament and intersection density. This suggests that the azimuthal distribution of lineaments is reasonably consistent throughout the project area. One must note, however, that the reliability of results obtained from the moving average computations decreases at the periphery of the study area to produce a boundary zone of low density as shown in Fig. 7.

Lineament Patterns Near the Domes

Based on Figs. 7 and 8, lineament distributions were examined within a 15-mile radius of each dome, with the following results:

1) Richton Dome: One of the two highest lineament density belts (> 10) in the entire project area passes east-west through the center of Richton Dome. High intersection densities, however, only occur in the extreme northwest corner of the area examined. Both lineament and intersection densities are low directly over the dome center.
2) Lampton Dome: At the time the regional map was prepared aerial photography was not available for the southern margins of the study area. Consequently, only portions of Lampton and Cypress Creek Dome sites could be subjected to analysis (see section on Dome Specific Studies). An area of high lineament and intersection density is located about seven miles northeast of the dome center. Two other areas of high lineament density are found to the north and northwest.
3) Cypress Creek Dome: An insufficient portion of this study area is included in the digitized regional map for any valid interpretations to be made.


A
B
C
N
5 0 5 MILES
8 4 0 8 KILOMETERS
LAMPTON DOME
CYPRESS CREEK DOME
LEGEND
1-2 MILES
3-4 MILES
5-6 MILES
7-8 MILES
>9 MILES

NOTE:

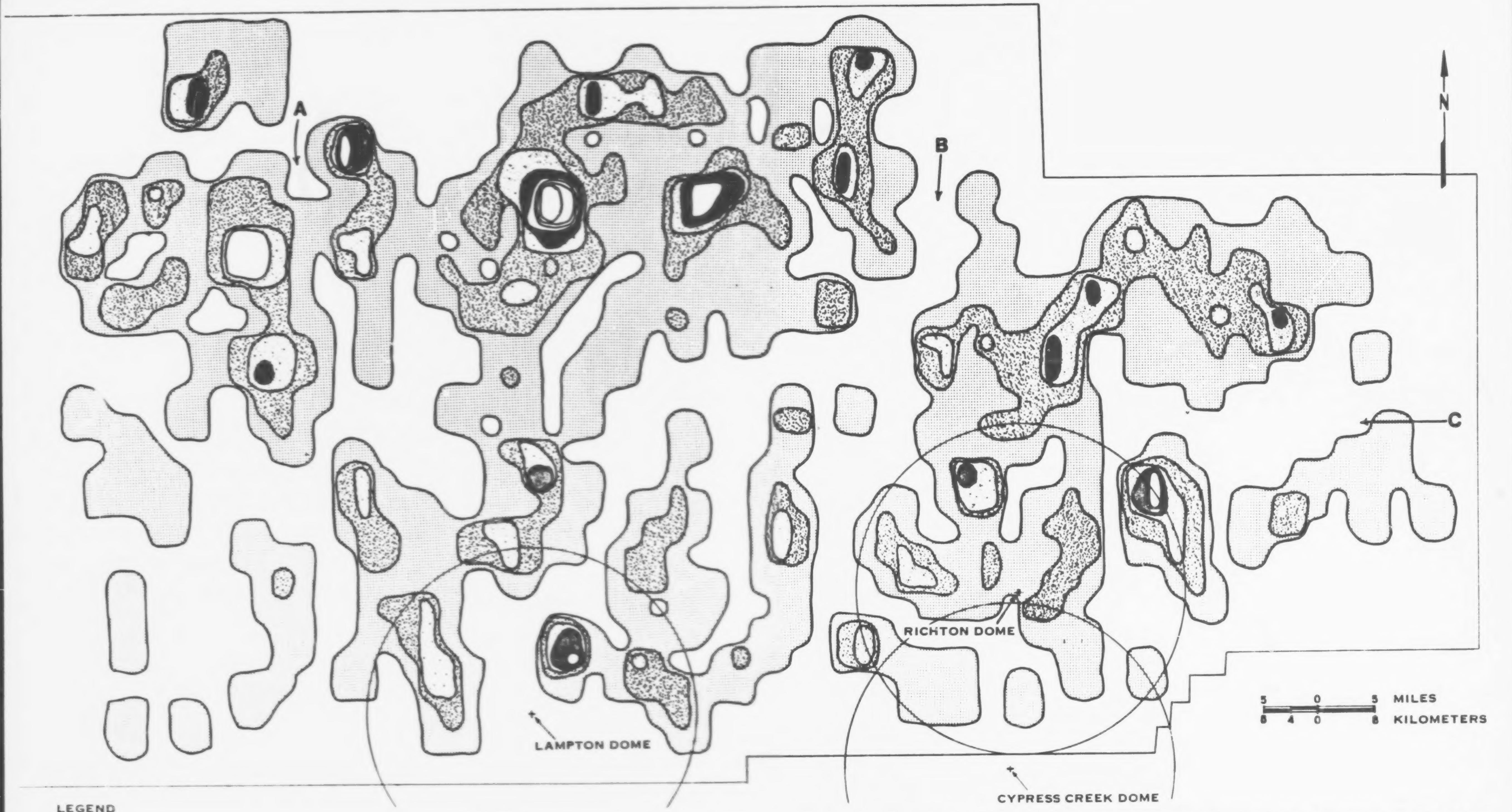
ZIPATONE PATTERNS WERE SUBSTITUTED BY LAW ENGINEERING FOR THE COLOR CODED KEY THAT WAS ON ORIGINAL FIGURE.

ORIGINAL SCALE WAS 1:160,000. FIGURE REDUCED BY LAW ENGINEERING PERSONNEL TO SCALE SHOWN

FIGURE 7 CUMULATIVE LENGTH (DENSITY) OF LINEAMENTS IN MILES PER 2 X 2 INCH CELL ON THE 1:250,000 SCALE REGIONAL MAP (FIG. 7). DOME SITES ARE INDICATED ALONG WITH BELTS OF LOW DENSITY (A, B, C). DOUBLE ASTERISK REPRESENTS MORE THAN 10 MILES.

FIGURE 7

BEST DOCUMENT AVAILABLE


A
B
C
N
LAMPTON DOME
RICHTON DOME
CYPRESS CREEK DOME
5 0 5 MILES
8 4 0 8 KILOMETERS

LEGEND

☐	1-2
▨	3-4
☐	5-6
■	7-8
☐	>8
—	DIGITIZED AREA

NOTE

ZIPATONE PATTERNS WERE SUBSTITUTED BY LAW ENGINEERING FOR THE COLOR CODED KEY THAT WAS ON THE ORIGINAL FIGURE

ORIGINAL SCALE WAS 1:160,000. FIGURE REDUCED BY LAW ENGINEERING PERSONNEL TO SCALE SHOWN

FIGURE 8 NUMBER OF LINEAMENT INTERSECTIONS PER 2 X 2 INCH CELL ON THE 1:250,000 SCALE REGIONAL MAP (FIG. 7). DOME SITES ARE INDICATED ALONG WITH BELTS OF LOW DENSITY (A, B, C).

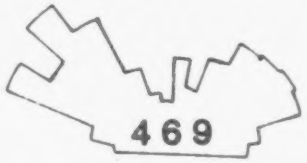
FIGURE 8

ROSE DIAGRAMS FOR TEST AREA

AZIMUTHS OF FRACTURES, IN 10 DEGREE INCREMENTS

00-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130	130-140	140-150	150-160	160-170	170-180		
13	19	41	33	45	37	22	15	13	23	16	25	31	32	33	32	21	18	12S-	5W
36	35	66	64	77	70	54	36	31											

ARITHMETIC MEAN= 46. 133. WEIGHTED ARITH MEAN= 45. 133. NUMBER OF FRACTURES=469



AZIMUTHS OF FRACTURES, IN 10 DEGREE INCREMENTS

00-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130	130-140	140-150	150-160	160-170	170-180		
26	39	46	75	60	55	50	19	29	25	24	42	56	60	58	55	44	35	12S-	5W
51	63	88	131	120	113	105	63	64											

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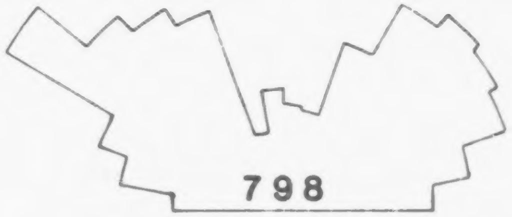

AZIMUTHS OF FRACTURES, IN 10 DEGREE INCREMENTS

00-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130	130-140	140-150	150-160	160-170	170-180		
1	0	1	2	2	0	1	1	0	0	2	2	9	1	6	2	0	0	12S-	5W
1	2	3	11	3	6	3	1	0											

ARITHMETIC MEAN= 41. 131. WEIGHTED ARITH MEAN= 42. 130. NUMBER OF FRACTURES=30

30

FIGURE 9 ROSE DIAGRAMS FOR THE THREE BLOCKS OF LINEAMENTS DIGITIZED FROM FIGURE 6.

NOTE.
REDRAFTED BY LAW ENGINEERING PERSONNEL FOR CLARITY

FIGURE 9

[redacted]

DOME SPECIFIC STUDIES

Richton, Lampton, and Cypress Creek domes were individually examined in further detailed studies of the 1:120,000 scale color-infrared aerial photographs. Film transparencies of the areas within a 15 mile radius of each dome center were analyzed by the two geologists to prepare dome specific lineament maps at 1:100,000 scale. Corresponding drainage maps for the same areas were prepared using U.S.G.S. 7½' and 15' topographic sheets, supplemented with color-infrared photographs in the areas for which map coverage was unavailable. The objective of these studies was to obtain data which would help relate the structural development of the individual domes to the regional structural framework, and provide additional clues to the stability of the domes.

Lineaments

Each geologist independently examined and prepared overlays for the individual film transparencies covering the three dome areas, identifying lineaments based on the previously discussed criteria. Photographs were examined using a Bausch and Lomb Stereo Interpretation System 95 and a Bausch and Lomb Zoom 70 viewing system. Viewing magnifications ranged from 3 to 15X, with the lower magnifications preferred because of the increased field of view.

A master overlay at 1:120,000 scale of the lineaments around each dome site was prepared from composites of the single image overlays. The lineaments on the master overlays were then transferred to gridded base sheets at a scale of 1:100,000 with the aid of the Saltzman projector (Figs. 10 and 11). Brief analyses of the lineament patterns surrounding the domes are presented in the following paragraphs.

Richton Dome (Fig. 10)

Several lineaments with NE/SW orientations pass through the core of the dome site. A belt of relatively low lineament density surrounds the core, and does not appear to be related to masking of lineaments by alluvial sediments. Outward from the core, the predominant orientation is NW/SE. A single long lineament of NW/SE orientation intersects the NE/SW core lineaments northeast of the dome center.

Cypress Creek Dome (Fig. 10)

Cypress Creek Dome is centered in a limited area (of approximately 1½ mile radius) with comparatively low lineament density. Lineaments outside this area are predominantly of NW/SE orientation. In a totally denuded area 1½ miles NE of the dome center, a dense zone of strongly reticulate lineaments may be seen, the origin of which is unknown.

Lampton Dome (Fig. 11)

There are no clearly defined relationships between the position of Lampton Dome and the distribution of lineaments in its vicinity. However, there is some suggestion of a belt of NW/SE oriented lineaments passing through the center of the dome area.

The maps of the lineament patterns surrounding each dome site provide an excellent data source for quantitative analyses similar to those undertaken on a regional scale. It is recommended that the lineaments be encoded and analyzed with the aid of the computer programs.

Drainage

For the dome-specific analyses, detailed drainage network maps were necessary. The principal data sources were U.S.G.S. 7½' and 15' topographic maps which were available for all of the dome areas except a small region

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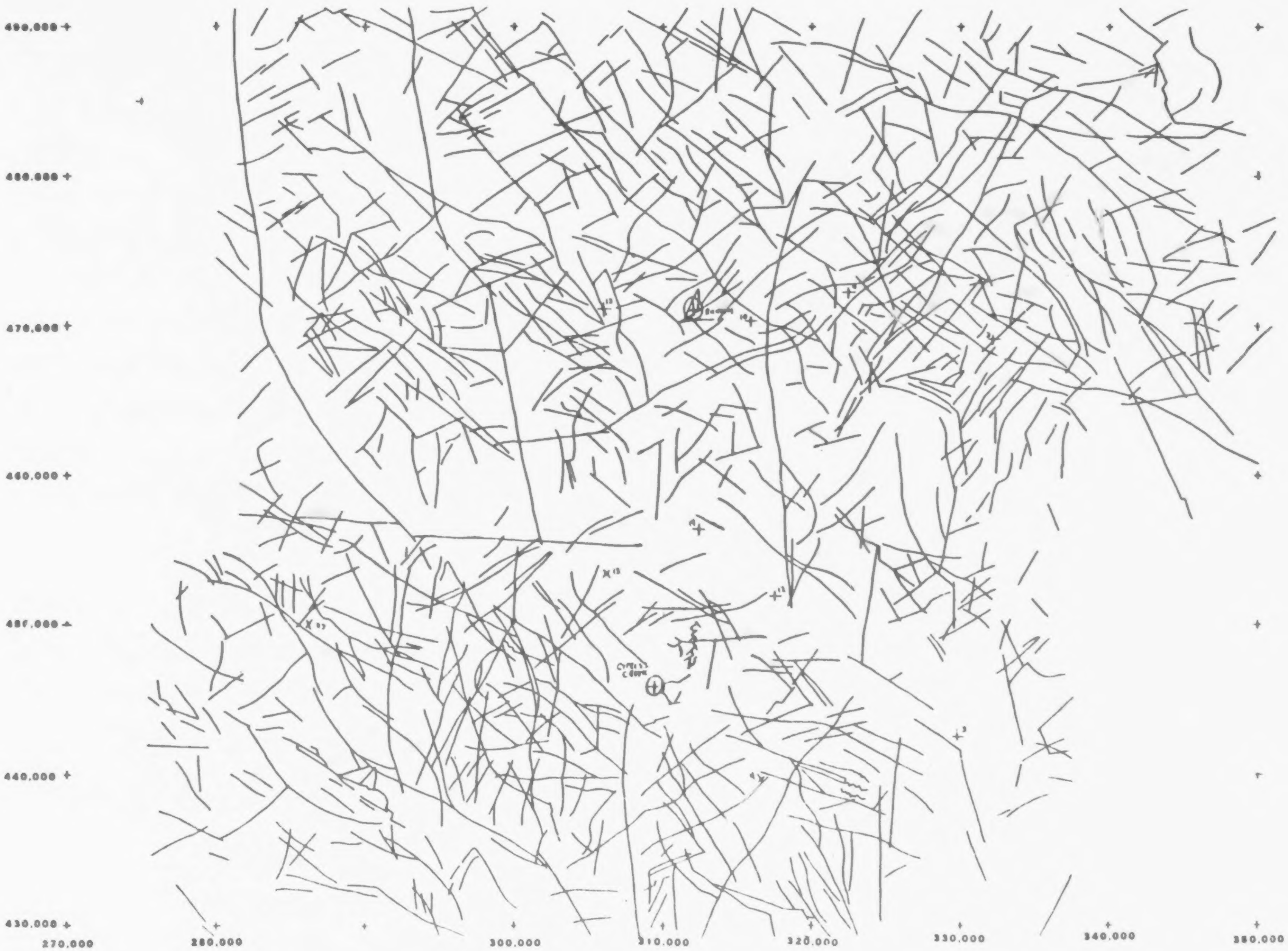

490.000
480.000
470.000
460.000
450.000
440.000
430.000
270.000
280.000
300.000
310.000
320.000
330.000
340.000
350.000

NOTE:

ORIGINAL SCALE WAS 1:100.000.FIGURE REDUCED BY LAW ENGINEERING PERSONNEL TO SCALE SHOWN

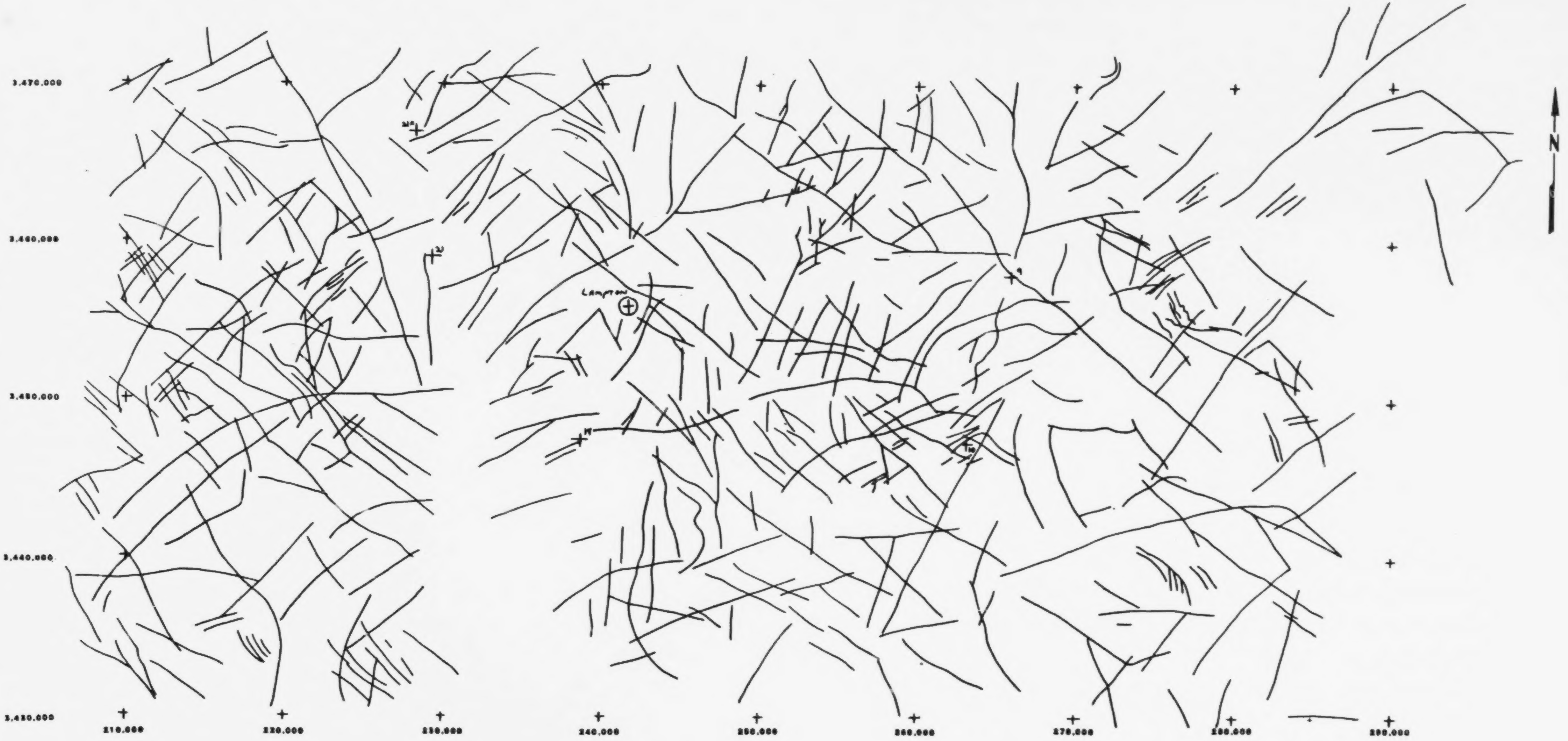
⊕ APPROXIMATE DOME CENTER

5 0 5 MILES
8 4 0 8 KILOMETERS

FIGURE 10 1:100,000 SCALE MAP OF LINEAMENTS PATTERNS WITHIN APPROXIMATELY 15 MILES OF RICHTON AND CYPRESS CREEK DOMES. THIS DOME SPECIFIC MAP WAS COMPILED BY TWO GEOLOGISTS FROM THE COLOR INFRARED TRANSPARENCIES AND PRINTS.

FIGURE 10

[redacted]


3,470,000
3,460,000
3,450,000
3,440,000
3,430,000
210,000
220,000
230,000
240,000
250,000
260,000
270,000
280,000
290,000
Lampton
N

5
0
5
MILES
8
4
0
8
KILOMETERS
⊕ APPROXIMATE DOME CENTER

NOTE:

ORIGINAL SCALE WAS 1:100,000, FIGURE REDUCED BY LAW ENGINEERING PERSONNEL TO SCALE SHOWN.

FIGURE 11 1:100,000 SCALE MAP OF LINEAMENT PATTERNS WITHIN APPROXIMATELY 15 MILES OF LAMPTON DOME. THIS DOME SPECIFIC MAP WAS COMPILED BY TWO GEOLOGISTS FROM THE COLOR INFRARED TRANSPARENCIES AND PRINTS.

over the north-central portion of Lampton dome. In this latter area, the 1:120,000 scale color-infrared images and selected USDA 1:20,000 scale panchromatic photographs were employed to complete the drainage map. Because of the extensive masking of drainage systems by vegetation in the dome areas, topographic maps proved superior to photographs for preparing drainage maps.

Drainage overlays were prepared from the thirty topographic sheets required to cover the dome sites. Control points were established on each overlay to permit later registration with the dome-specific lineament maps. Each overlay was then photographically reduced from 1:24,000 or 1:62,500 to 1:100,000 scale and the resulting prints mosaicked together to produce a composite map of drainage around each dome. Three final drainage map products were generated using this procedure (Figs. 12, 13 and 14).

The variety of sources used to compile drainage data influenced the density of drainage networks depicted on these maps. This was an unavoidable problem which must be taken into consideration when interpreting the results.

Richton Dome (Fig. 12)

Richton Dome is located practically at the crest of a divide separating two of the higher order streams in the study area. Channel segments of intermediate order (2nd and 3rd)[1] in the vicinity of the dome appear to be preferentially oriented in a NW/SE direction, parallel to one of the major lineament modes in the area. Few streams appear to be oriented in a NE/SW direction (parallel to the other major lineament mode).

---

[1] Because several different data sources exhibiting different degrees of detail were used in the preparation of the three dome-specific drainage maps, the use of numerical stream orders is relative.

Cypress Creek Dome (Fig. 13)

Cypress Creek Dome is centered at the headward end of the drainage basin of a large 3rd order stream. Orientations of channel segments in this region do not display the correlation with the lineament modes observed at Richton Dome. In general, no clear orientation is evident here and the drainage pattern is classically dendritic. There are no apparent indications of structural control.

Lampton Dome (Fig. 14)

Lampton Dome is located near the crest of a divide from which radial drainage extends in several directions. Drainage in the vicinity of the dome appears to be heavily influenced by the major NW/SE orientation of the Pearl River. Some stretches of the river appear to be structurally controlled. A preferred stream orientation around Lampton Dome could not be determined.

It should be noted that except in areas exhibiting high degrees of structural control, the rather random appearance of most stream networks makes evaluation of their morphology difficult without the application of standardized quantitative measures such as stream length ratio. It is suggested that such an approach could be applied.

Relation of Lineament Distribution to Drainage Networks

As was noted from the regional lineament map, lineaments correlate more strongly with river valleys as their length increases; this is particularly true for lineaments with NW/SE orientation. This relationship was observed in the vicinity of all three domes.

Most river channels in the study area are degrading or balanced in nature and, consequently, tend to reflect the same types of structural

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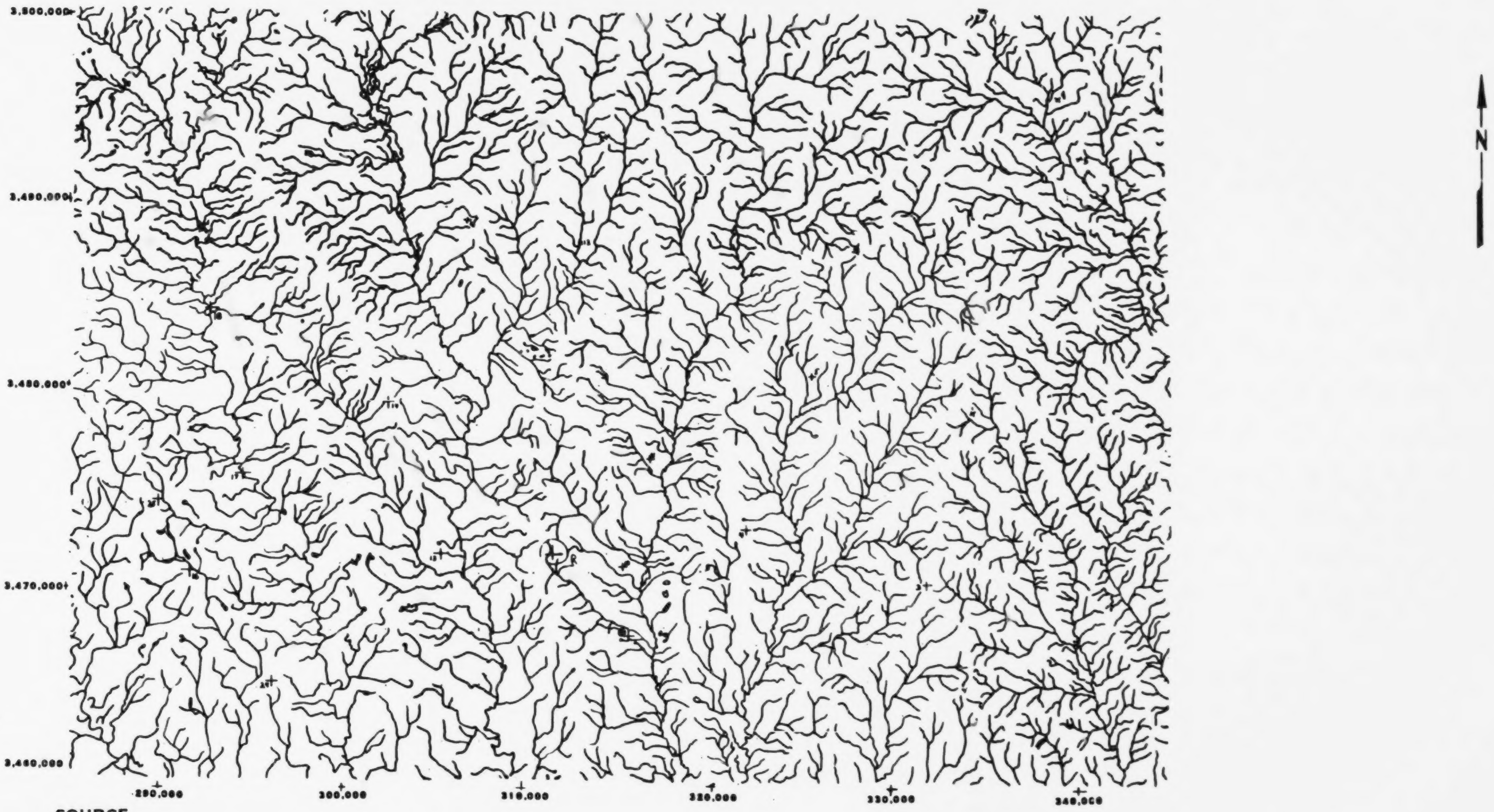

3,500,000
3,490,000
3,480,000
3,470,000
3,460,000
290,000
300,000
310,000
320,000
330,000
340,000
N
R

SOURCE

U.S.G.S. TOPOGRAPHIC SHEETS
ELLISVILLE
LAMPTON
STRENGTHFORD
WATER OAK
CLARA
BARRONTOWN
OVETT
OVETT S.E.
RHODES
MULBERRY
PIAVE
AUERA
BREWER
RICHTON
CARTERVILLE

⊕ APPROXIMATE DOME CENTER

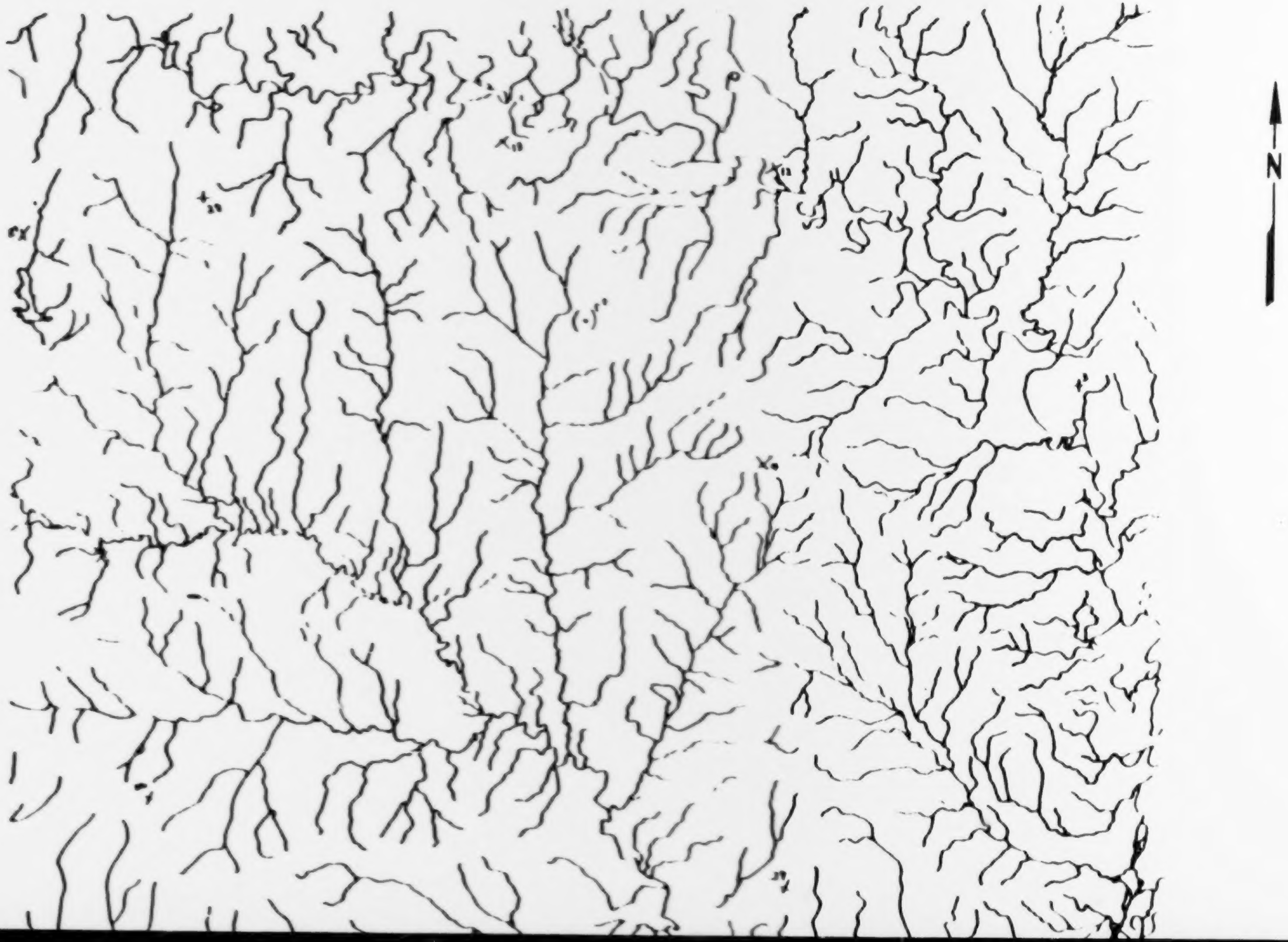
5 0 5 MILES
8 4 0 8 KILOMETERS

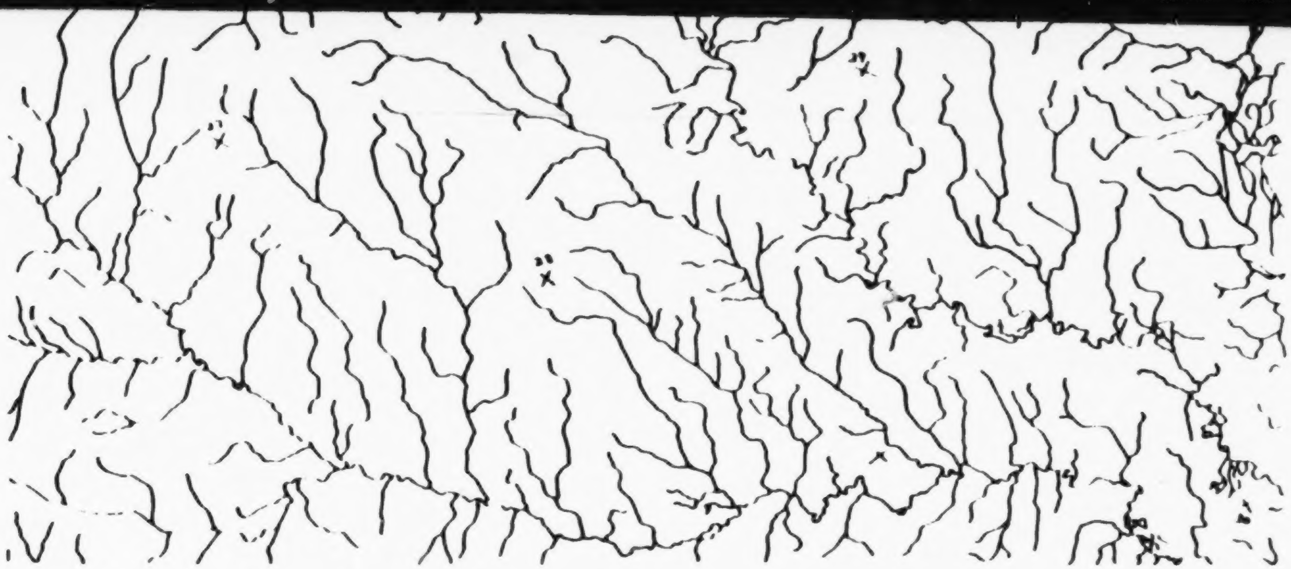
NOTE:

ORIGINAL SCALE WAS 1:100,000. FIGURE IS REDUCED BY LAW ENGINEERING PERSONNEL TO SCALE SHOWN.

FIGURE 12 1:100,000 SCALE MAP OF DRAINAGE PATTERNS WITHIN APPROXIMATELY 15 MILES OF RICHTON DOME. THIS DOME SPECIFIC MAP WAS COMPILED FROM 1:24,000 SCALE USGS TOPOGRAPHIC QUADRANGLES AND CAN BE REGISTERED WITH FIGURE 10.

436





SOURCE

U.S.G.S. TOPOGRAPHIC SHEETS 1:62,500
NEW AUGUSTA
BEAUMONT
WIGGINS
BENNDALE

FIGURE 13 1:100,000 SCALE MAP OF DRAINAGE PATTERNS WITHIN APPROXIMATELY 15 MILES OF CYPRESS CREEK DOME. THIS DOME SPECIFIC MAP WAS COMPILED FROM 1:62,500 SCALE USGS TOPOGRAPHIC MAPS AND CAN BE REGISTERED WITH FIGURE 10

( ) APPROXIMATE DOME CENTER

NOTE

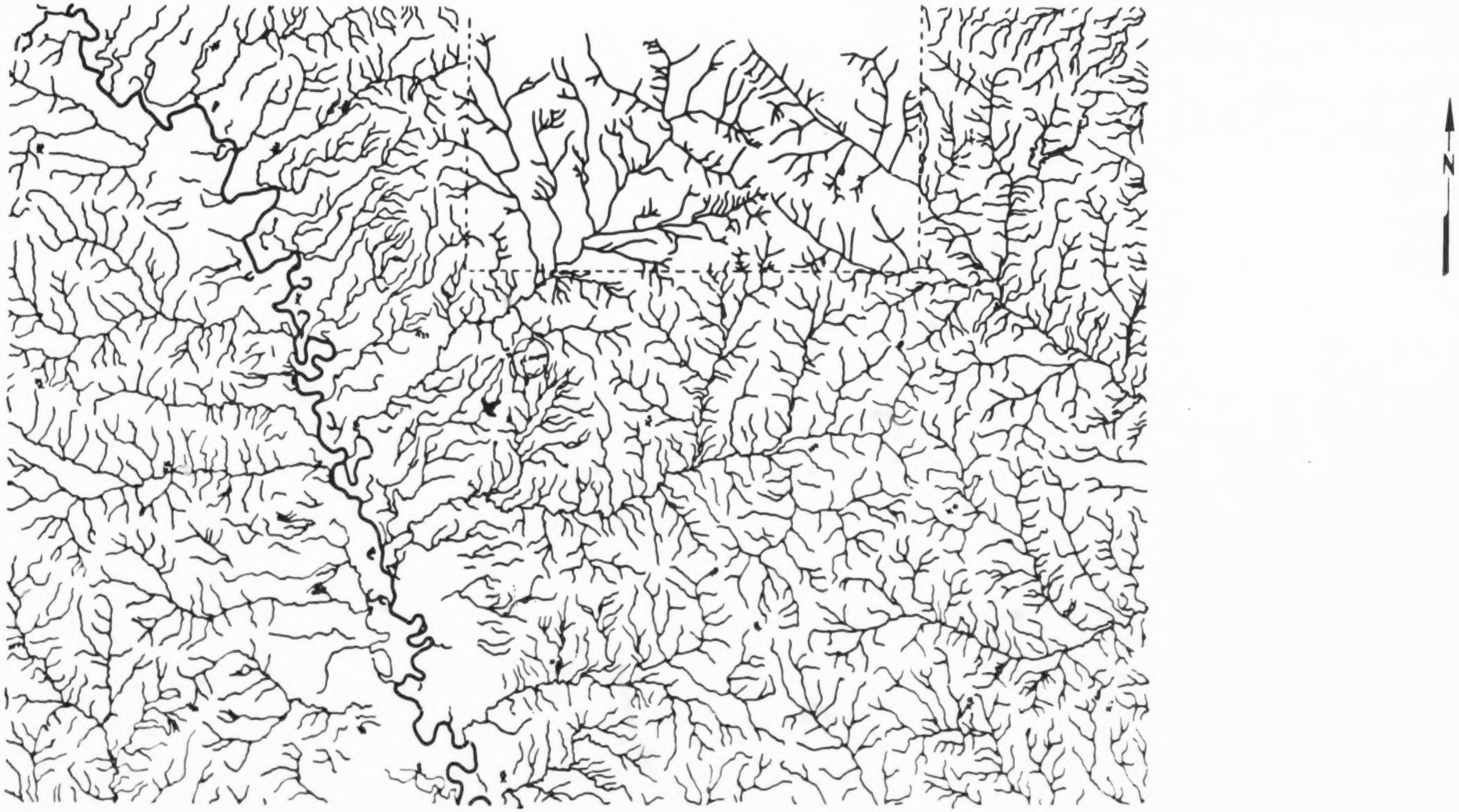
ORIGINAL SCALE WAS 1:100,000 FIGURE REDUCED BY LAW ENGINEERING PERSONNEL TO SCALE SHOWN

5 0 5 MILES
8 4 0 8 KILOMETERS

436A

FIGURE 13

BEST DOCUMENT AVAILABLE



SOURCE

U.S.G.S. TOPOGRAPHIC SHEETS 1:24,000
MOREANTOWN
COLUMBIA N.
SANDY HOOK N.W.
COLUMBIA S.
DEXTER
SANDY HOOK
PINE BUR
BAXTERVILLE
BAXTERVILLE S.W.
BAXTERVILLE N.E.
HATTIESBURG S.W.
PURVIS
LUMBERTOWN
NASA/MSC HIGH ALTITUDE CIR.

LEGEND

- - - - - - DRAINAGE DELINEATION WITH AIR PHOTOS

5 0 5 MILES

8 4 0 8 KILOMETERS

NOTE

ORIGINAL SCALE WAS 1:100,000. FIGURE REDUCED BY LAW ENGINEERING PERSONNEL TO SCALE SHOWN.

FIGURE 14 1:100,000 SCALE MAP OF DRAINAGE PATTERNS WITHIN APPROXIMATELY 15 MILES OF LAMPTON DOME. THIS DOME SPECIFIC MAP WAS COMPILED FROM AERIAL PHOTOGRAPHS AND 1:24,000 SCALE USGS TOPOGRAPHIC MAPS AND CAN BE REGISTERED WITH FIGURE 11.

features indicated by lineaments. The largest river segments, however, are aggradational, indicated by broad meandering, abandoned meander loops, and comparatively broad flood plains. These aggradational streams have deposited extensive bodies of alluvial fill, which tend to mask any underlying lineaments. This effect may be clearly seen in the detailed lineament and drainage maps for Lampton Dome (Figs. 11 and 14).

In order to fully explore the differences between structural controls indicated by lineament and drainage patterns, a rigorous quantitative analysis should be undertaken. Such an approach is possible with existing computer programs.

CONCLUSION

The analyses of the Landsat images and color-infrared aerial photographs of the Mississippi Basin have resulted in the preparation of 1:250,000 and 1:100,000 scale maps of lineament/drainage patterns for the project region and for the local areas within about 15 miles of Richton, Cypress Creek, and Lampton domes. Two dominant lineament orientations are evident: 1) a NW/SE mode; and 2) a NE/SW mode at roughly right angles to the first set. Drainage appears to correlate reasonably with lineament orientations. However, there are no obvious relationships between the dome locations and lineament patterns.

Quantitative analyses of lineament patterns on the regional map compiled from the aerial photographs appear to provide particularly useful data on orientation, density, and number of intersections per areal unit (4 in^2). Although difficulties in obtaining and setting-up the computer programs for this task resulted in delays which have precluded the application of quantitative techniques to the individual domes, it is recommended that such analyses be conducted. Similarly, a quantitative approach to the analysis of drainage patterns should be considered.

Overall, the analyses of the Landsat images and small-scale aerial photographs have permitted the compilation of useful map products which can be related to the geologic structure of the Mississippi Basin and to selected salt domes. Correlation of these data with information obtained from large scale aerial photographs and thermal-infrared images should provide further useful information which can be employed to assess salt dome stability.

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MISSISSIPPI STUDY AREA

APPENDIX D-2

TERRACE AND GEOLOGIC MAPPING DATA

Surface and near-surface geologic studies in the vicinity of Cypress Creek and Richton Domes were performed by the University of Southern Mississippi (USM) under contract to Law Engineering. The purpose of these studies was to map terrace levels in the supradomal areas in order to determine if they have been affected by domal movement.

Split spoon samples from the Area Characterization shallow borings were transmitted to USM for analysis. Geophysical logs and preliminary Area Characterization shallow boring field logs were also provided to USM by Law Engineering personnel.

These data were integrated with data obtained during field mapping efforts by Law Engineering. The results of analyses of these data are presented in Law Engineering reports "Surface Geologic Reconnaissance of Richton Dome, Perry County, Mississippi" and "Surface Geologic Reconnaissance of Cypress Creek Dome, Perry County, Mississippi."

[redacted]

APPENDIX E

Geophysics

MISSISSIPPI STUDY AREA

APPENDIX E-1

RESISTIVITY VERTICAL SOUNDINGS

Electrical resistivity surveys involving vertical soundings were made by Law Engineering personnel in the areas adjacent to Cypress Creek and Richton Salt Domes. The analysis of these soundings aided in understanding the near-surface geology. The soundings were performed concurrently with resistivity horizontal profiles (Appendix E-2). All work was done in accordance with Law Engineering Procedure No. 3.2, "Ground-Level Resistivity Surveys Data Collection". The work was performed with an A.B.E.M. Terrameter 4-cycle direct-current resistivity meter with the electrodes in a Wenner array. The spacing between electrodes, or "a" spacing, was varied from 0.6 meter (2 ft) to a maximum of 213 meters (700 ft). The value measured in these surveys is electrical resistivity, the amount of resistance of a material to flow of electric current per unit cross-sectional area divided by unit length. The units of resistivity are in terms of electrical resistance multiplied by distance, typically ohm-feet (Ω').

The soundings were interpreted using the inverse slope method and the results are presented in the form of pseudologs. The interpretation of the pseudologs yields approximate depths to boundaries between geo-electric units that generally correspond to lithologic units. The depths to geo-electric boundaries are considered to be approximately equal to the "a" spacing. The

[redacted]

appearance of thin geo-electric units in the pseudologs may be caused by lateral variation in the resistivity of surface material rather than by a change at depth.

Thirty-three electrical resistivity soundings were made in the vicinity of Cypress Creek Salt Dome between April, 1979 and January 1980. The locations of the soundings are shown in Figure E-1.1 and the pseudologs are presented in Table E-1.1.

Forty-seven electrical resistivity soundings were made in the vicinity of Richton Salt Dome between September, 1979 and April 1980. The locations of the soundings are shown in Figure E-1.2 and the pseudologs are presented in Table E-1.2.

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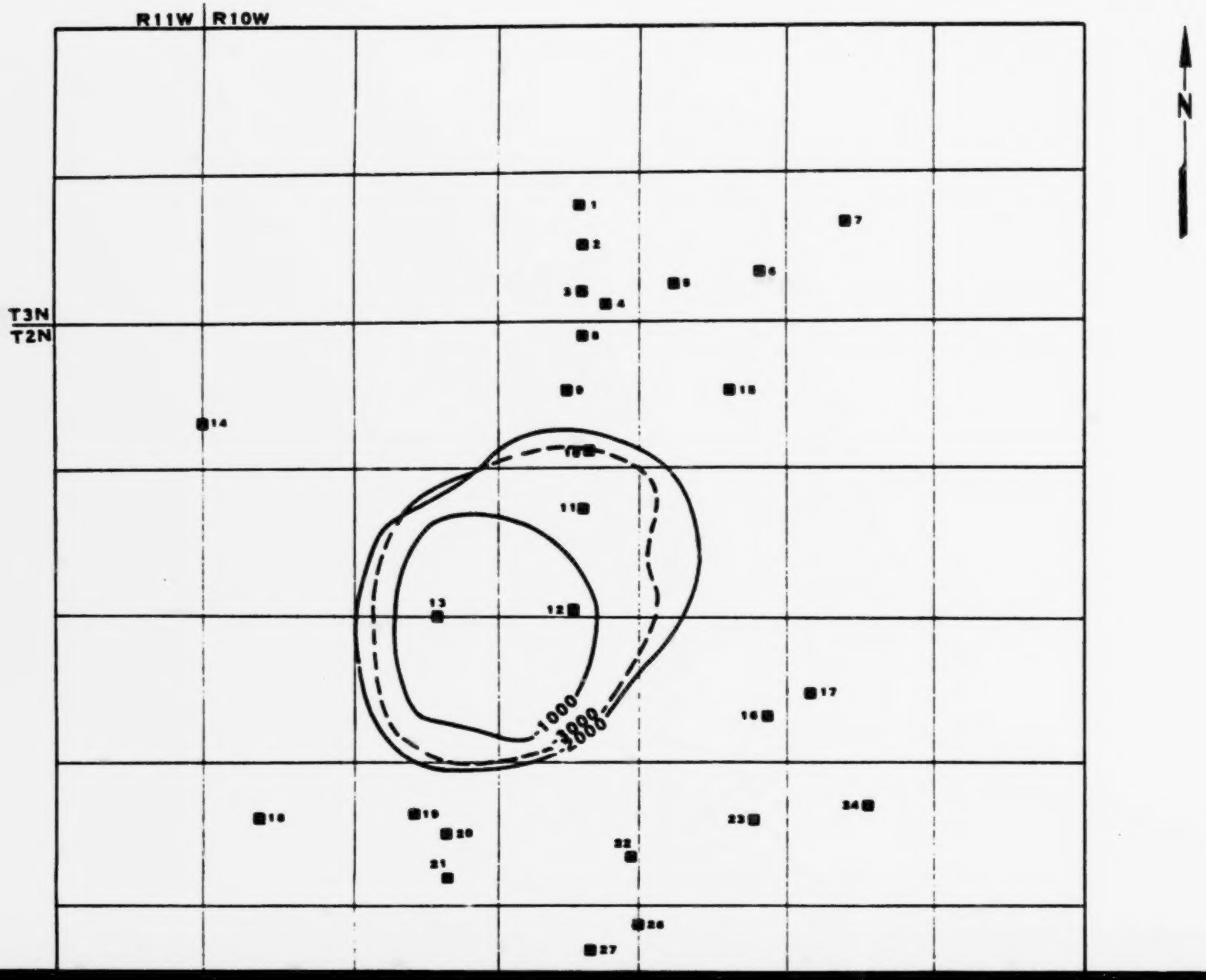
R11W
R10W
T3N
T2N
N
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2
3
4
5
6
7
8
9
10
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14
15
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17
18
19
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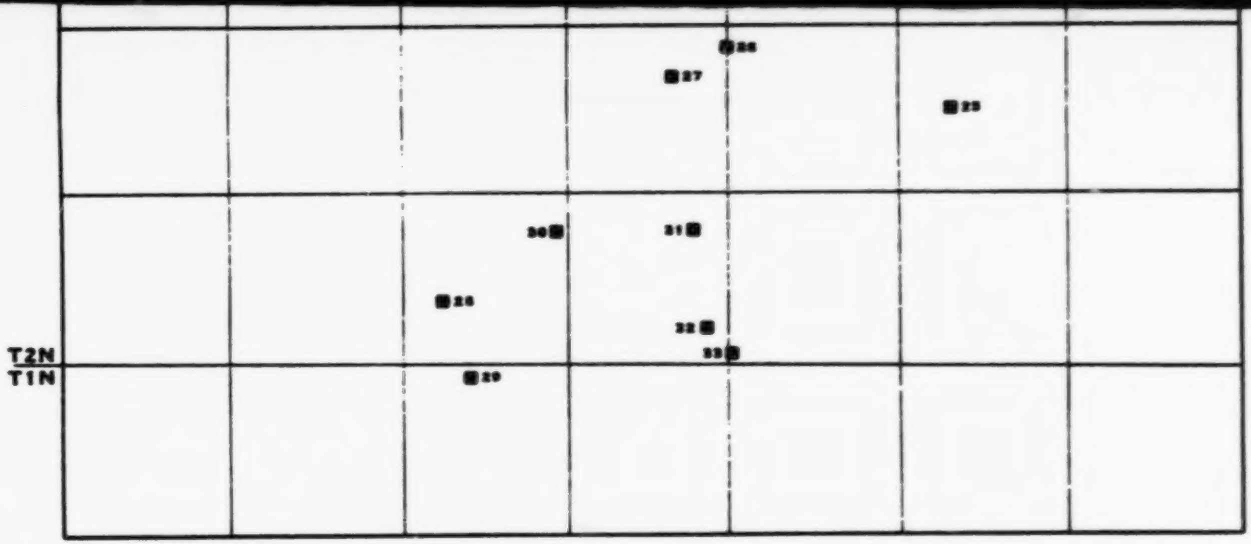
21
22
23
24
26
27
1000
2000
3000

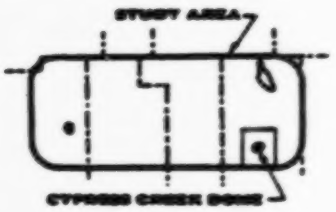

26
27
25
30
31
28
32
33
29
T2N
T1N

LEGEND

■ 13	GROUND LEVEL RESISTIVITY VERTICAL SOUNDING MCS-13
-1000	INTERPRETED SALT CONTOUR ELEVATION FEET MSL (DASHED WHERE BENEATH OVERHANG)

NOTE

SEE TABLE E-1.1 FOR PSEUDOLOG REPRESENTATION OF VERTICAL SOUNDINGS


STUDY AREA
CYPRESS CREEK DOME

1
0
1
MILES
1
0
1
KILOMETERS

447A

BEST DOCUMENT AVAILABLE

FIGURE E-1.1

PREPARED	J.D.G	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GHF	DATE	12/22/80

T-1558-0

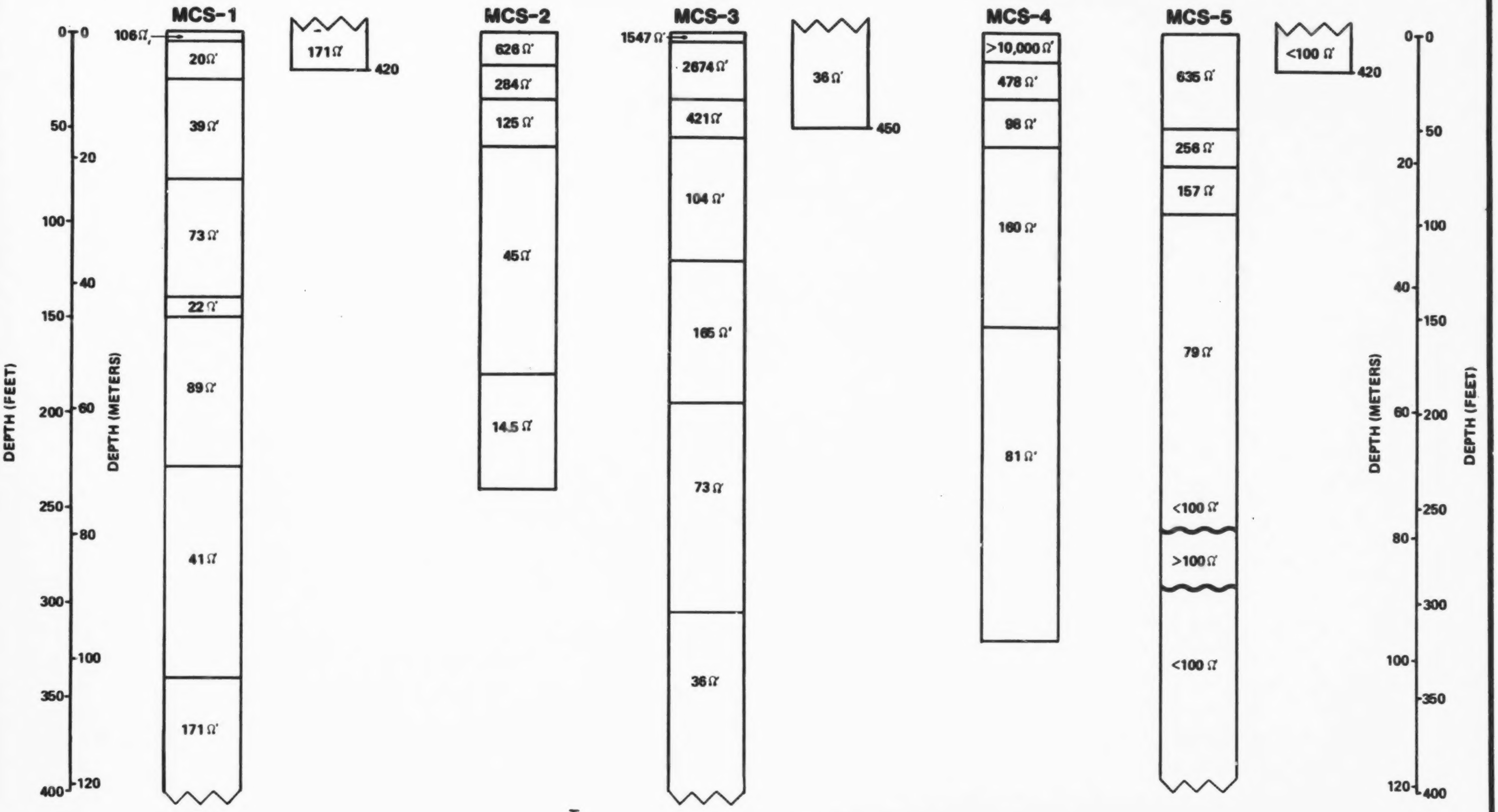
NATIONAL WASTE TERMINAL
STORAGE PROGRAM
GEOLOGIC EVALUATION GULF
COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX E-1
CYPRESS CREEK DOME
LOCATION MAP OF VERTICAL
RESISTIVITY SOUNDINGS

JOB NO. MV9700

FIGURE E-1.1


MCS-1
MCS-2
MCS-3
MCS-4
MCS-5
DEPTH (FEET)
DEPTH (METERS)
0
50
100
150
200
250
300
350
400
20
40
60
80
100
120
106Ω'
20Ω'
39Ω'
73Ω'
22Ω'
89Ω'
41Ω'
171Ω'
171Ω'
420
626Ω'
284Ω'
125Ω'
45Ω
14.5Ω
1547Ω'
2674Ω'
421Ω
104Ω'
165Ω'
73Ω
36Ω
36Ω'
450
>10,000Ω'
478Ω'
98Ω'
160Ω'
81Ω'
635Ω
256Ω'
157Ω
79Ω
<100Ω
>100Ω
<100Ω
<100Ω
420

LEGEND

45Ω' RESISTIVITY IN OHM · FEET

GRADUAL CHANGE IN RESISTIVITY

BREAK IN FIGURE

NOTE

SEE FIGURE E-1.1 FOR LOCATION OF SOUNDINGS

PREPARED	J.D.G.	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GHF	DATE	12/22/80

T-1588A-0

NATIONAL WASTE TERMINAL
STORAGE PROGRAM
GEOLOGIC EVALUATION GULF
COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA, GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX E-1
CYPRESS CREEK DOME
PSEUDOLOGS OF ELECTRICAL
RESISTIVITY VERTICAL SOUNDINGS

JOB NO. MV9700

TABLE E-1.1
PAGE 1 OF 6

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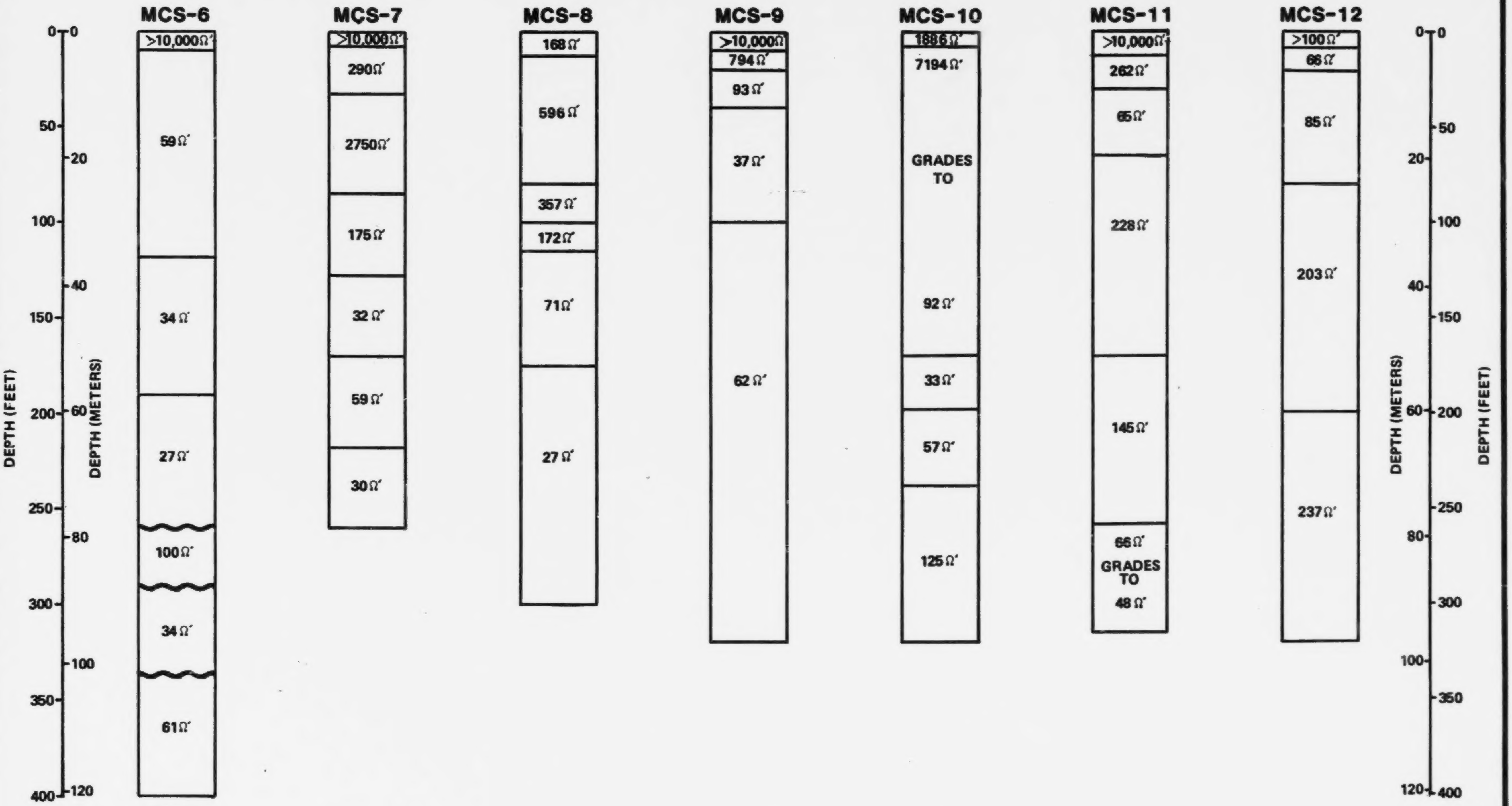
MCS-6
MCS-7
MCS-8
MCS-9
MCS-10
MCS-11
MCS-12
DEPTH (FEET)
DEPTH (METERS)
0
50
100
150
200
250
300
350
400
20
40
60
80
100
120
MCS-6: >10,000Ω′; 59Ω′; 34Ω′; 27Ω′; 100Ω′; 34Ω′; 61Ω′
MCS-7: >10,000Ω′; 290Ω′; 2750Ω′; 175Ω′; 32Ω′; 59Ω′; 30Ω′
MCS-8: 168Ω′; 596Ω′; 357Ω′; 172Ω′; 71Ω′; 27Ω′
MCS-9: >10,000Ω; 794Ω′; 93Ω′; 37Ω′; 62Ω′
MCS-10: 1886Ω′; 7194Ω′ GRADES TO 92Ω′; 33Ω′; 57Ω′; 125Ω′
MCS-11: >10,000Ω′; 262Ω′; 65Ω′; 228Ω′; 145Ω′; 66Ω′ GRADES TO 48Ω′
MCS-12: >100Ω′; 66Ω′; 85Ω′; 203Ω′; 237Ω′

LEGEND

45Ω′ RESISTIVITY IN OHM - FEET

〰 GRADUAL CHANGE IN RESISTIVITY

NOTE

SEE FIGURE E-1.1 FOR LOCATION OF SOUNDINGS

PREPARED J.D.G. DATE 12/22/80
REVISED DATE
REVISED DATE
APPROVED GHF DATE 12/22/80
T-1588B-0

NATIONAL WASTE TERMINAL
STORAGE PROGRAM
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COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA, GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX E-1
CYPRESS CREEK DOME
PSEUDOLOGS OF ELECTRICAL
RESISTIVITY VERTICAL SOUNDINGS
JOB NO. MV9700
TABLE E-1.1
PAGE 2 OF 6

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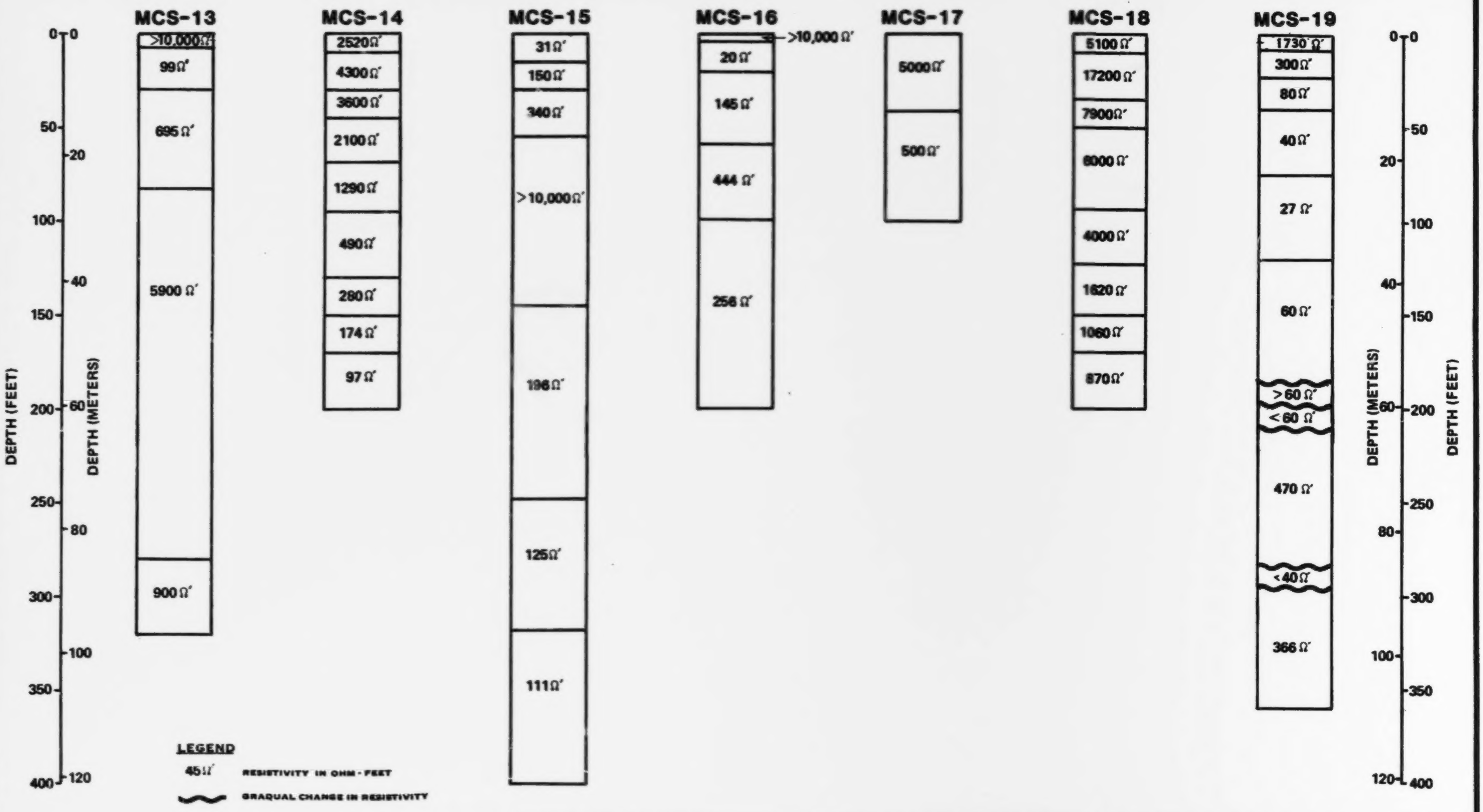
MCS-13
>10,000Ω'
99Ω'
695Ω'
5900Ω'
900Ω'
MCS-14
2520Ω'
4300Ω'
3600Ω'
2100Ω'
1290Ω'
490Ω'
280Ω'
174Ω'
97Ω'
MCS-15
31Ω'
150Ω'
340Ω'
>10,000Ω'
196Ω'
125Ω'
111Ω'
MCS-16
>10,000Ω'
20Ω'
145Ω'
444Ω'
256Ω'
MCS-17
5000Ω'
500Ω'
MCS-18
5100Ω'
17200Ω'
7900Ω'
6000Ω'
4000Ω'
1620Ω'
1060Ω'
870Ω'
MCS-19
1730Ω'
300Ω'
80Ω'
40Ω'
27Ω'
60Ω'
>60Ω'
<60Ω'
470Ω'
<40Ω'
366Ω'
DEPTH (FEET)
DEPTH (METERS)
0
50
100
150
200
250
300
350
400
20
40
60
80
100
120
LEGEND
45Ω' RESISTIVITY IN OHM - FEET
GRADUAL CHANGE IN RESISTIVITY

NOTE

SEE FIGURE E-1.1 FOR LOCATION OF SOUNDINGS

PREPARED	J.D.G	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GHF	DATE	12/22/80

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NATIONAL WASTE TERMINAL STORAGE PROGRAM
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MARIETTA, GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX E-1
CYPRESS CREEK DOME
PSEUDOLOGS OF ELECTRICAL RESISTIVITY VERTICAL SOUNDINGS

JOB NO. MV9700

TABLE E-1.1
PAGE 3 OF 6

450

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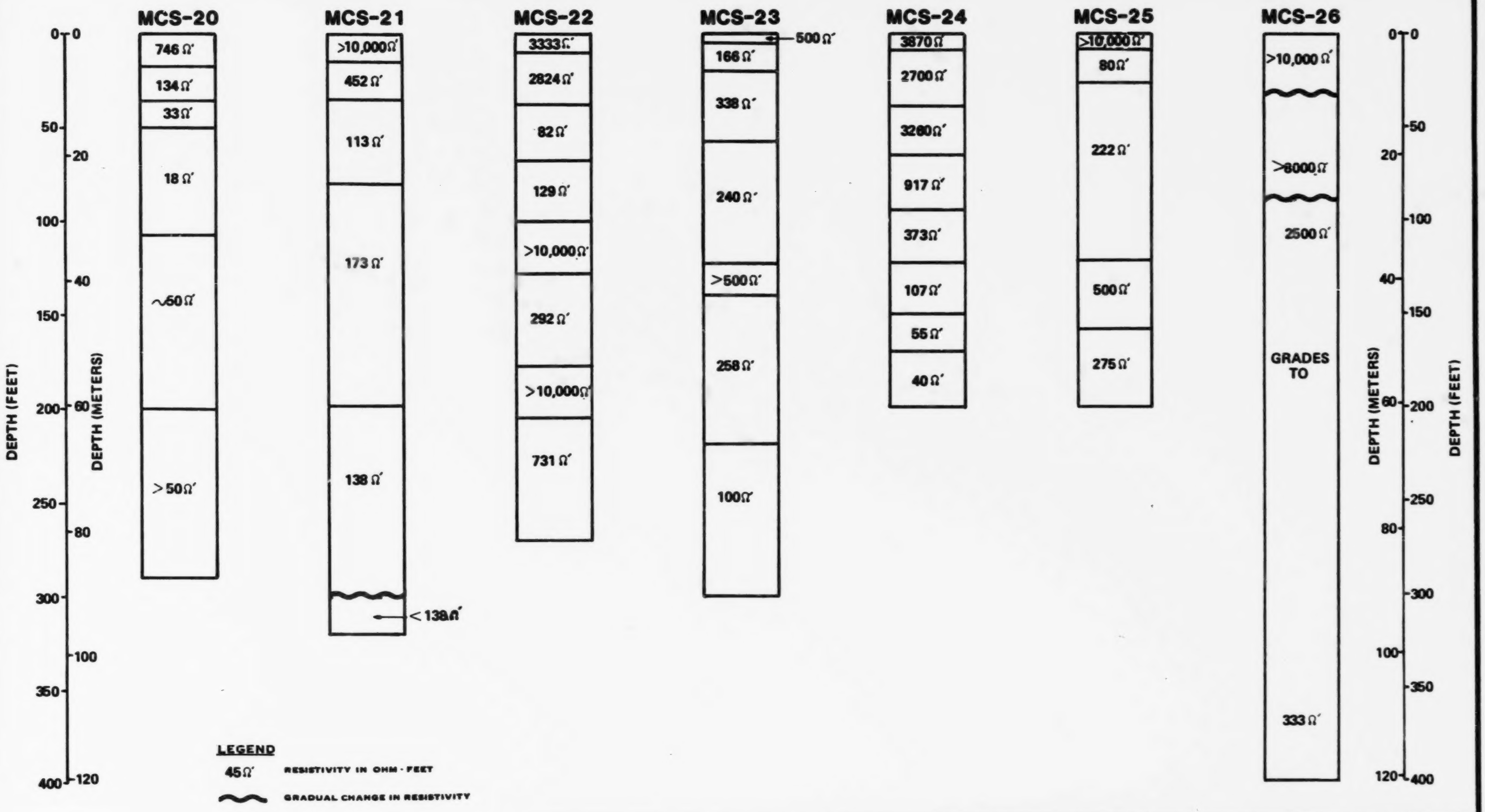
MCS-20
746 Ω'
134 Ω'
33 Ω'
18 Ω'
~50 Ω'
>50 Ω'
MCS-21
>10,000 Ω'
452 Ω'
113 Ω'
173 Ω'
138 Ω'
< 138 Ω'
MCS-22
3333 Ω'
2824 Ω'
82 Ω'
129 Ω'
>10,000 Ω'
292 Ω'
>10,000 Ω'
731 Ω'
MCS-23
500 Ω'
166 Ω'
338 Ω'
240 Ω'
>500 Ω'
258 Ω'
100 Ω'
MCS-24
3870 Ω'
2700 Ω'
3260 Ω'
917 Ω'
373 Ω'
107 Ω'
55 Ω'
40 Ω'
MCS-25
>10,000 Ω'
80 Ω'
222 Ω'
500 Ω'
275 Ω'
MCS-26
>10,000 Ω'
>8000 Ω'
2500 Ω'
GRADES TO
333 Ω'
DEPTH (FEET)
DEPTH (METERS)
0
50
100
150
200
250
300
350
400
0
20
40
60
80
100
120
LEGEND
45 Ω' RESISTIVITY IN OHM - FEET
GRADUAL CHANGE IN RESISTIVITY

NOTE

SEE FIGURE E-1.1 FOR LOCATION OF SOUNDINGS

PREPARED J.D.G. DATE 12/22/80
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED GHF DATE 12/22/80

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NATIONAL WASTE TERMINAL
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GEOLOGIC EVALUATION GULF
COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA, GEORGIA

MISSISSIPPI STUDY AREA
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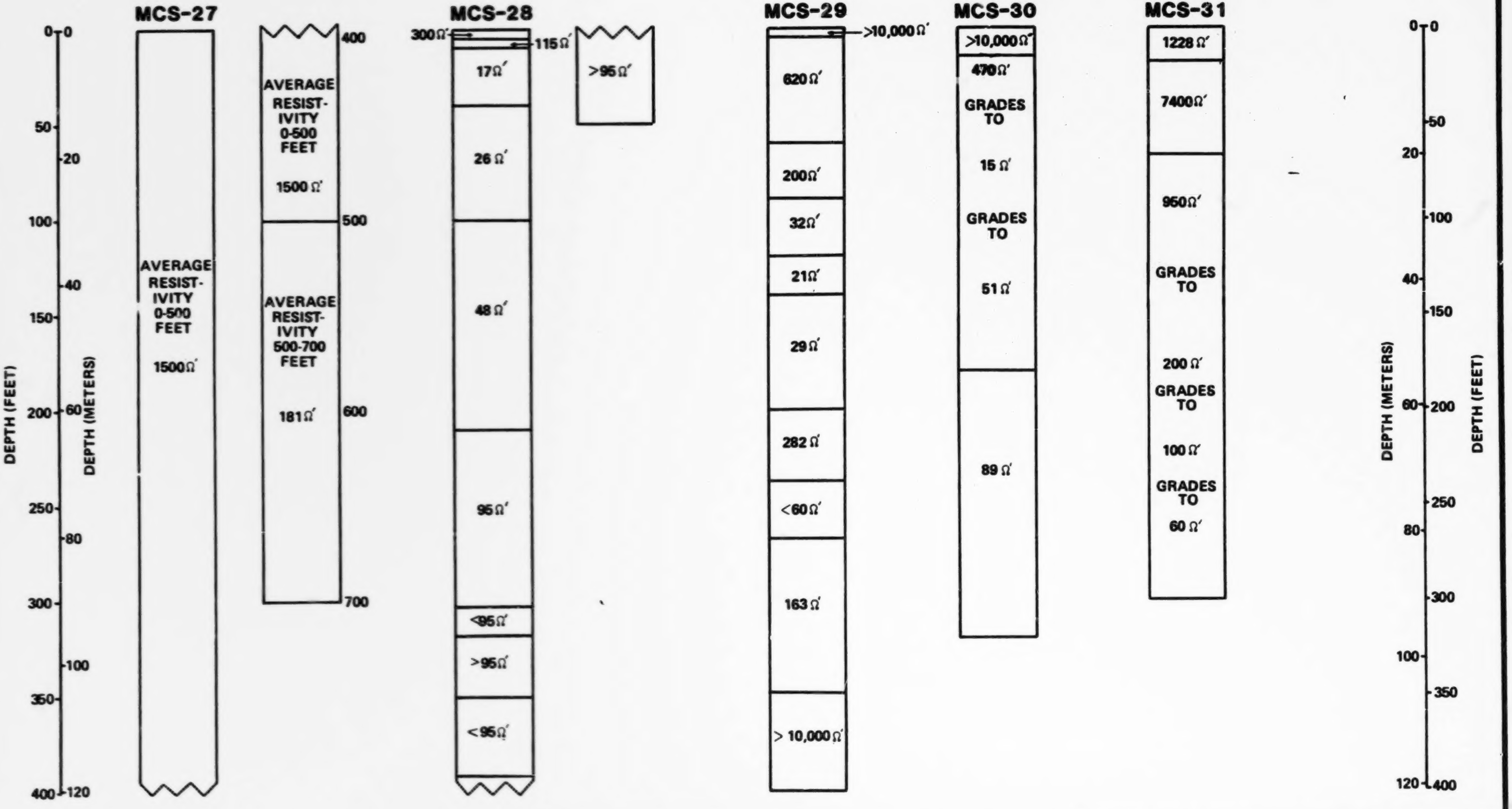
CYPRESS CREEK DOME
PSEUDOLOGS OF ELECTRICAL
RESISTIVITY VERTICAL SOUNDINGS

JOB NO. MV9700

TABLE E-1.1
PAGE 4 OF 6


MCS-27
MCS-28
MCS-29
MCS-30
MCS-31
DEPTH (FEET)
DEPTH (METERS)
0
50
100
150
200
250
300
350
400
0
20
40
60
80
100
120
AVERAGE RESIST-IVITY 0-500 FEET
1500Ω′
400
500
600
700
AVERAGE RESIST-IVITY 0-500 FEET
1500 Ω′
AVERAGE RESIST-IVITY 500-700 FEET
181Ω′
300Ω′
115Ω′
17Ω′
26 Ω′
48 Ω′
95 Ω′
<95Ω′
>95Ω′
<95Ω′
>95Ω′
>10,000Ω′
620Ω′
200Ω′
32Ω′
21Ω′
29Ω′
282 Ω′
<60Ω′
163 Ω′
> 10,000Ω′
>10,000Ω′
470Ω′
GRADES TO
15 Ω′
GRADES TO
51 Ω′
89 Ω′
1228 Ω′
7400Ω′
950Ω′
GRADES TO
200 Ω′
GRADES TO
100 Ω′
GRADES TO
60 Ω′
DEPTH (METERS)
DEPTH (FEET)
0
20
40
60
80
100
120
0
50
100
150
200
250
300
350
400

LEGEND

45Ω′	RESISTIVITY IN OHM - FEET
⋁⋁	BREAK IN FIGURE

NOTE

SEE FIGURE E-1.1 FOR LOCATION OF SOUNDINGS

PREPARED	J.D.G.	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GHF	DATE	12/22/80

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NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

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CYPRESS CREEK DOME
PSEUDOLOGS OF ELECTRICAL RESISTIVITY VERTICAL SOUNDINGS

JOB NO. MV9700

TABLE E-1.1
PAGE 5 OF 6

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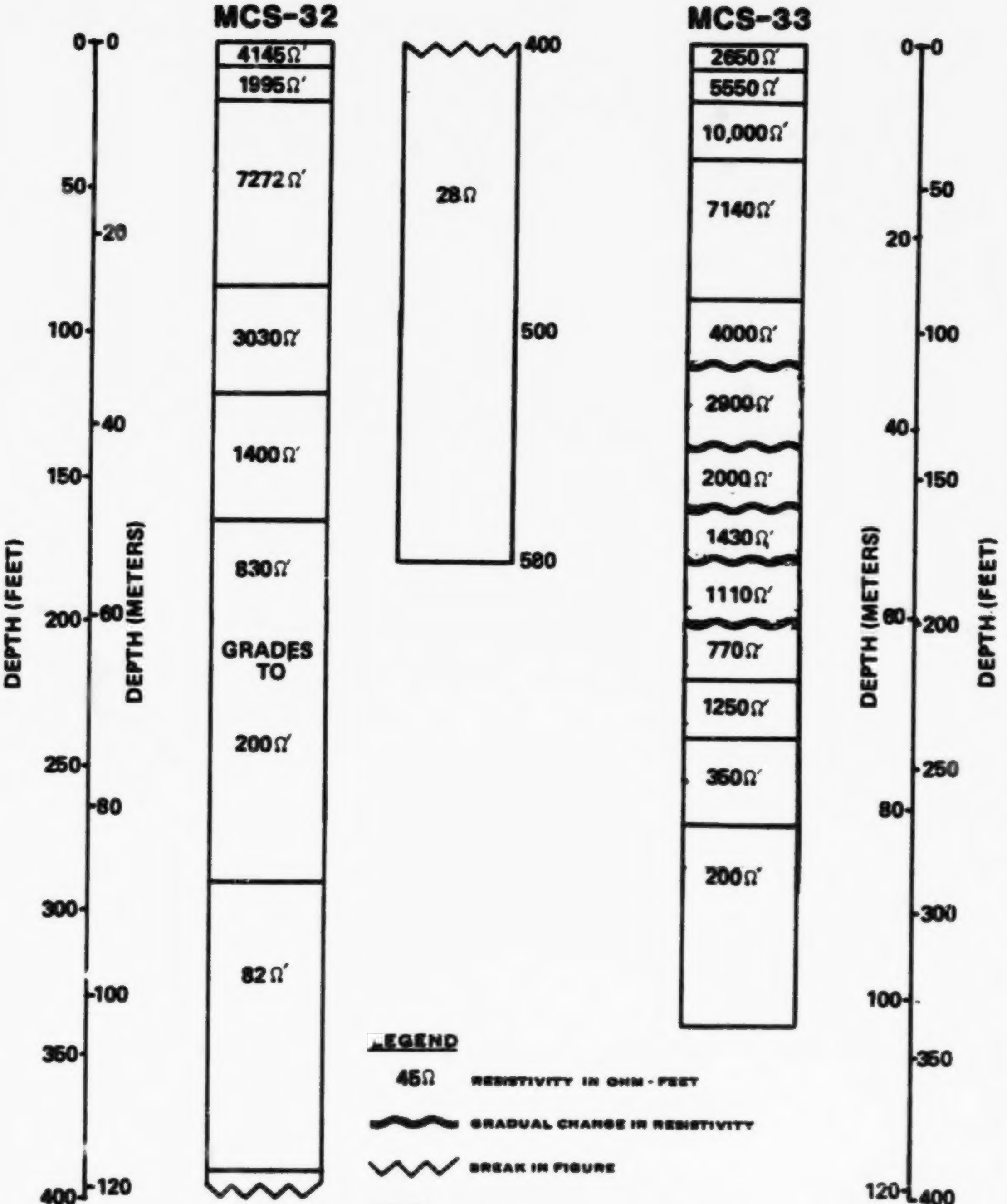

NOTE

SEE FIGURE E-1.1 FOR LOCATION OF SOUNDINGS

PREPARED SDG DATE
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED GHF DATE

T-1588F-0

NATIONAL WASTE TERMINAL STORAGE PROGRAM
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MISSISSIPPI STUDY AREA
APPENDIX E-1
CYPRESS CREEK DOME
PSEUDOLOGS OF ELECTRICAL RESISTIVITY VERTICAL SOUNDINGS

JOB NO. MV9700

TABLE E-1.1
PAGE 6 OF 6

[redacted]

454

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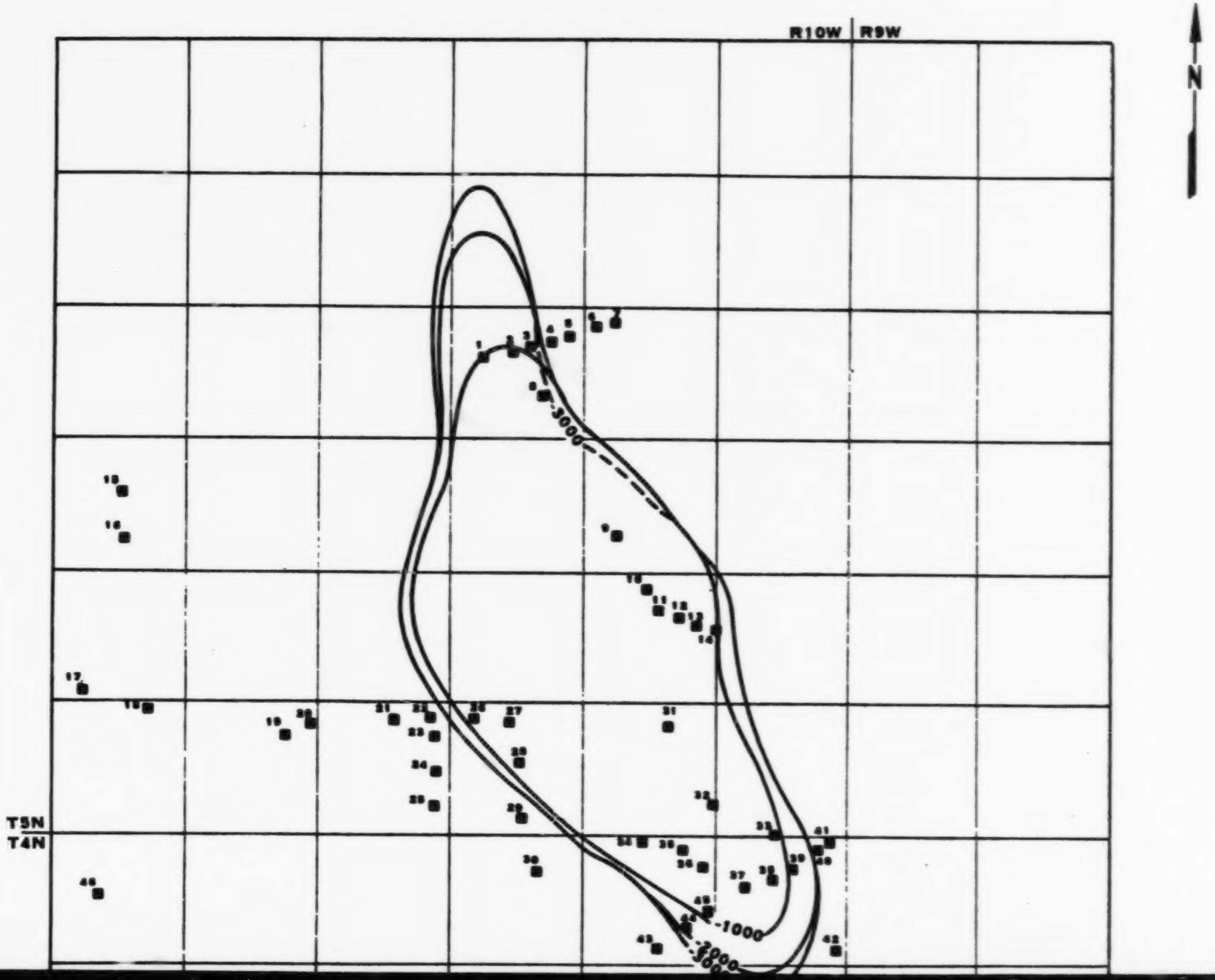
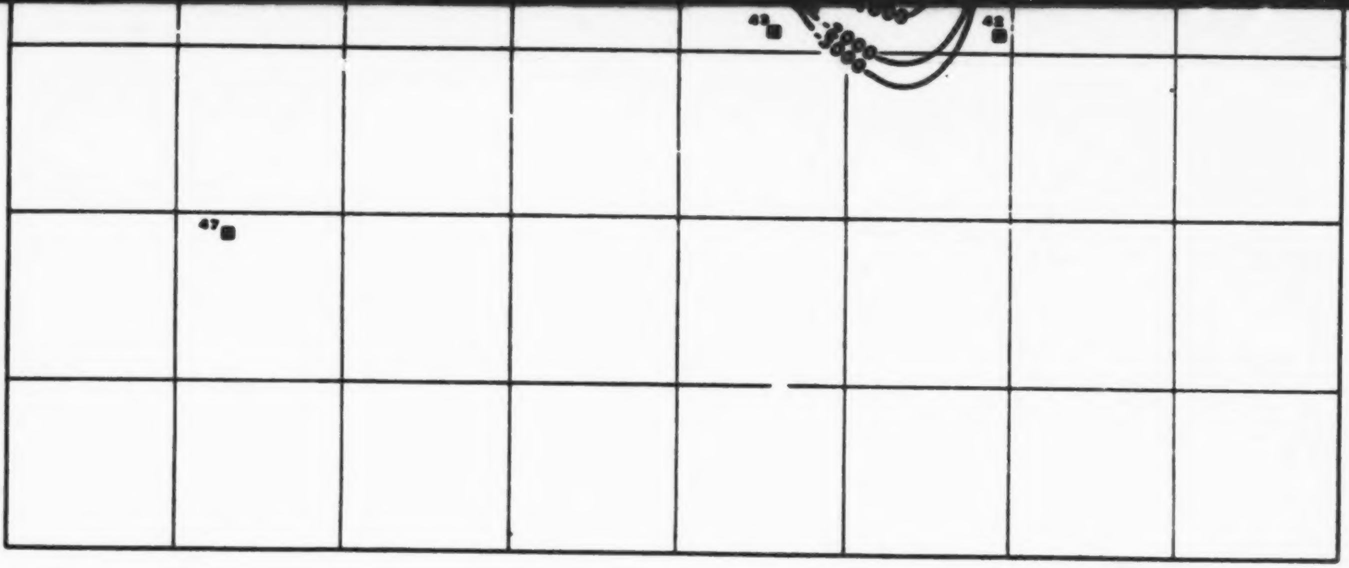

R10W
R9W
N
T5N
T4N
-1000
-2000
-3000
-3000
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46



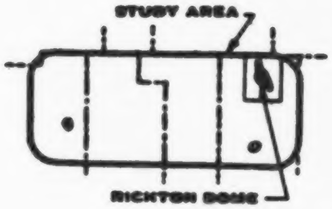
LEGEND

■ 16 GROUND LEVEL RESITIVITY VERTICAL SOUNDING MRS-16

—1000— INTERPRETED SALT CONTOUR ELEVATION FEET MSL (DASHED WHERE BENEATH OVERHANG)

NOTE

SEE TABLE E-1.2 FOR PSEUDOLOG REPRESENTATION OF VERTICAL SOUNDINGS



1
0
1
MILES
1
0
1
KILOMETERS

454A

PREPARED	J.D.G.	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GHF	DATE	12/22/80

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NATIONAL WASTE TERMINAL
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MISSISSIPPI STUDY AREA
APPENDIX E-1
RICHTON DOME
LOCATION MAP OF VERTICAL
RESISTIVITY SOUNDINGS

JOB NO. MV9700

FIGURE E-1.2

FIGURE E-1.2

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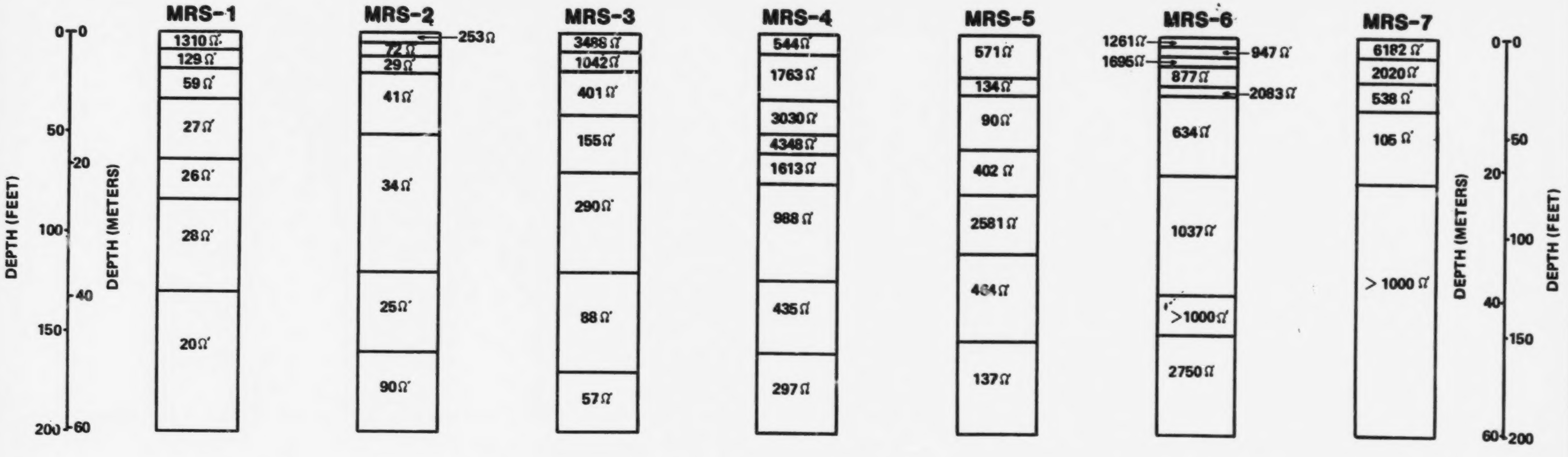
MRS-1
MRS-2
MRS-3
MRS-4
MRS-5
MRS-6
MRS-7
DEPTH (FEET)
DEPTH (METERS)
0
50
100
150
200
20
40
60
1310Ω
129Ω
59Ω
27Ω
26Ω
28Ω
20Ω
253Ω
72Ω
29Ω
41Ω
34Ω
25Ω
90Ω
3488Ω
1042Ω
401Ω
155Ω
290Ω
88Ω
57Ω
544Ω
1763Ω
3030Ω
4348Ω
1613Ω
988Ω
435Ω
297Ω
571Ω
134Ω
90Ω
402Ω
2581Ω
464Ω
137Ω
1261Ω
1696Ω
947Ω
877Ω
2083Ω
634Ω
1037Ω
>1000Ω
2750Ω
6182Ω
2020Ω
538Ω
105Ω
> 1000Ω

LEGEND

45Ω RESISTIVITY IN OHM - FEET

NOTE

SEE FIGURE E-1.2 FOR LOCATION OF SOUNDINGS

PREPARED J.D.G.	DATE 12/22/80
REVISED	DATE
REVISED	DATE
APPROVED GHF	DATE 12/22/80

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NATIONAL WASTE TERMINAL
STORAGE PROGRAM
GEOLOGIC EVALUATION GULF
COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
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MISSISSIPPI STUDY AREA
APPENDIX E-1
RICHTON DOME
PSEUDOLOGS OF ELECTRICAL
RESISTIVITY VERTICAL SOUNDINGS

JOB NO. MV9700

TABLE E-1.2
PAGE 1 OF 7

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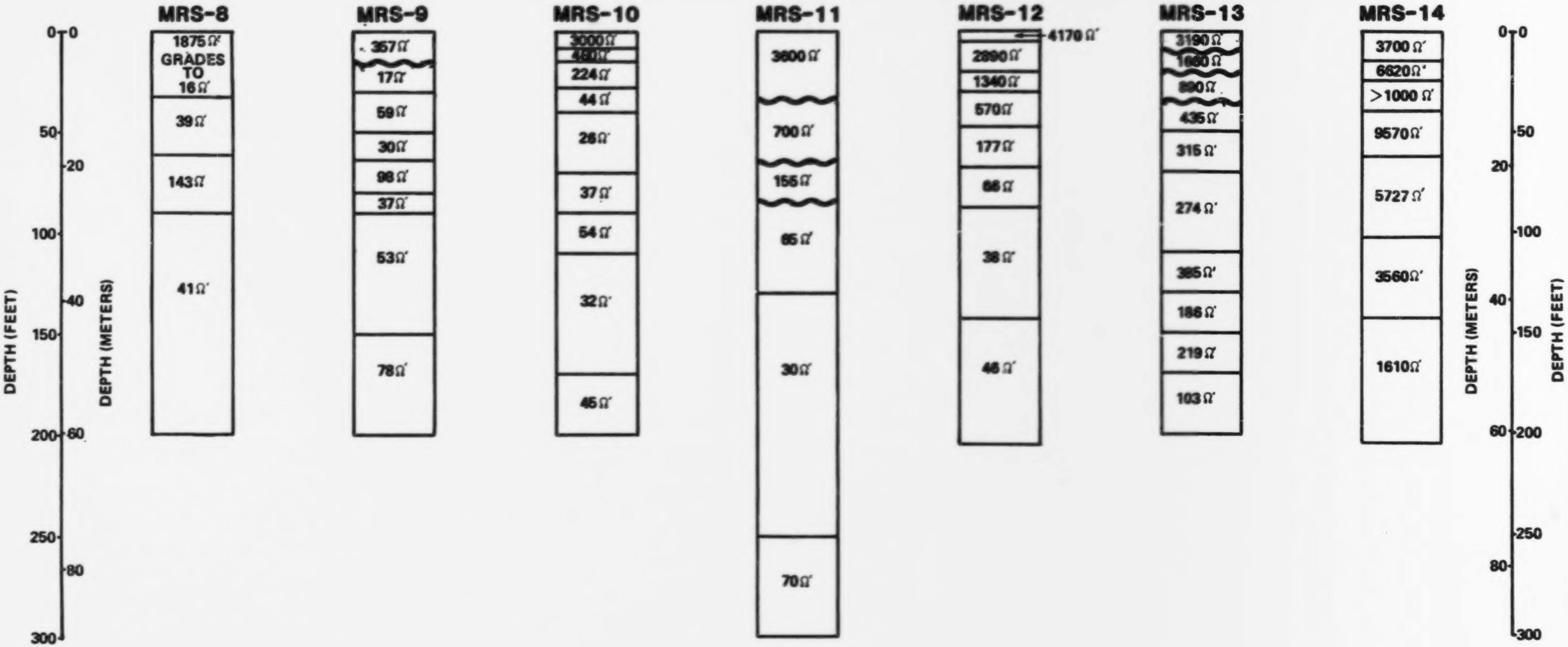
MRS-8
1875Ω'
GRADES TO
16Ω'
39Ω'
143Ω'
41Ω'
MRS-9
357Ω'
17Ω'
59Ω'
30Ω'
98Ω'
37Ω'
53Ω'
78Ω'
MRS-10
3000Ω'
480Ω'
224Ω'
44Ω'
26Ω'
37Ω'
54Ω'
32Ω'
45Ω'
MRS-11
3600Ω'
700Ω'
155Ω'
65Ω'
30Ω'
70Ω'
MRS-12
4170Ω'
2890Ω'
1340Ω'
570Ω'
177Ω'
66Ω'
38Ω'
46Ω'
MRS-13
3190Ω'
1660Ω'
890Ω'
435Ω'
316Ω'
274Ω'
385Ω'
186Ω'
219Ω'
103Ω'
MRS-14
3700Ω'
6620Ω'
>1000Ω'
9570Ω'
5727Ω'
3560Ω'
1610Ω'
DEPTH (FEET)
DEPTH (METERS)
0
50
100
150
200
250
300
0
20
40
60
80

LEGEND

45Ω' RESISTIVITY IN OHM - FEET

〰 GRADUAL CHANGE IN RESISTIVITY

NOTE

SEE FIGURE E-1.2 FOR LOCATION OF SOUNDINGS

PREPARED J.D.B. DATE 12/22/80
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED GHE DATE 12/22/80

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NATIONAL WASTE TERMINAL
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LAW ENGINEERING TESTING COMPANY
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PSEUDOLOGS OF ELECTRICAL
RESISTIVITY VERTICAL SOUNDINGS

JOB NO. MV9700

TABLE E-1.2
PAGE 2 OF 7

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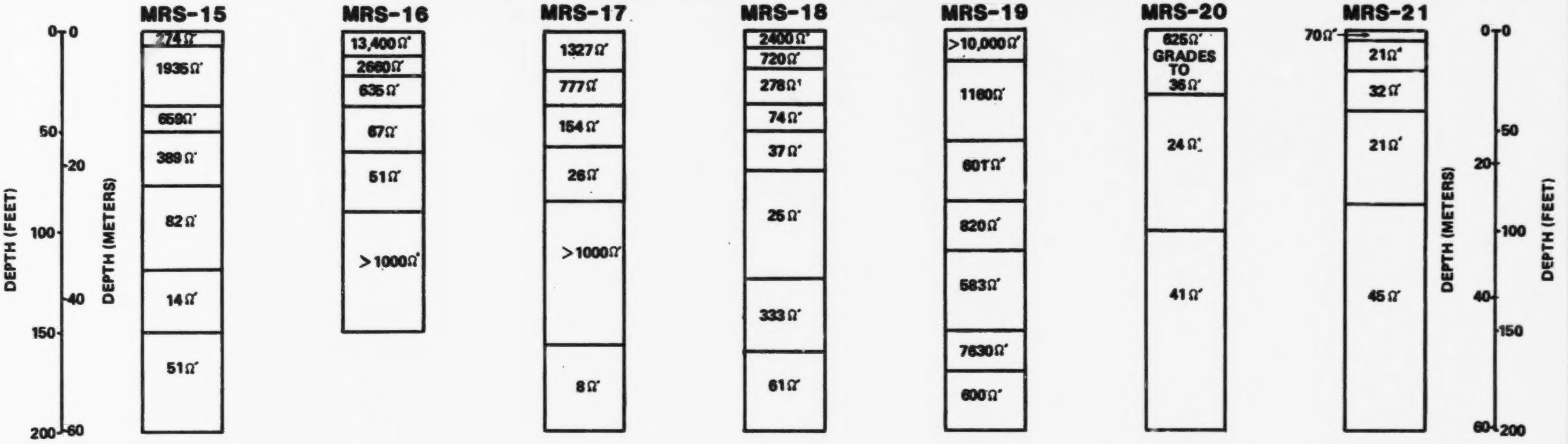
MRS-15
274Ω'
1935Ω'
659Ω'
389Ω'
82Ω'
14Ω'
51Ω'
MRS-16
13,400Ω'
2660Ω'
635Ω'
67Ω'
51Ω'
>1000Ω'
MRS-17
1327Ω'
777Ω'
154Ω'
26Ω'
>1000Ω'
8Ω'
MRS-18
2400Ω'
720Ω'
278Ω'
74Ω'
37Ω'
25Ω'
333Ω'
61Ω'
MRS-19
>10,000Ω'
1160Ω'
601Ω'
820Ω'
583Ω'
7630Ω'
600Ω'
MRS-20
625Ω'
GRADES
TO
36Ω'
24Ω'
41Ω'
MRS-21
70Ω'
21Ω'
32Ω'
21Ω'
45Ω'
DEPTH (FEET)
DEPTH (METERS)
0
50
100
150
200
0
20
40
60

LEGEND

45Ω' RESISTIVITY IN OHM - FEET

NOTE

SEE FIGURE E-1.2 FOR LOCATION OF SOUNDINGS

PREPARED J. D.G. DATE 12/22/80
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED GHF DATE 12/22/80
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NATIONAL WASTE TERMINAL
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APPENDIX E-1
RICHTON DOME
PSEUDOLOGS OF ELECTRICAL
RESISTIVITY VERTICAL SOUNDINGS
JOB NO. MV9700
TABLE E-1.2
PAGE 3 OF 7

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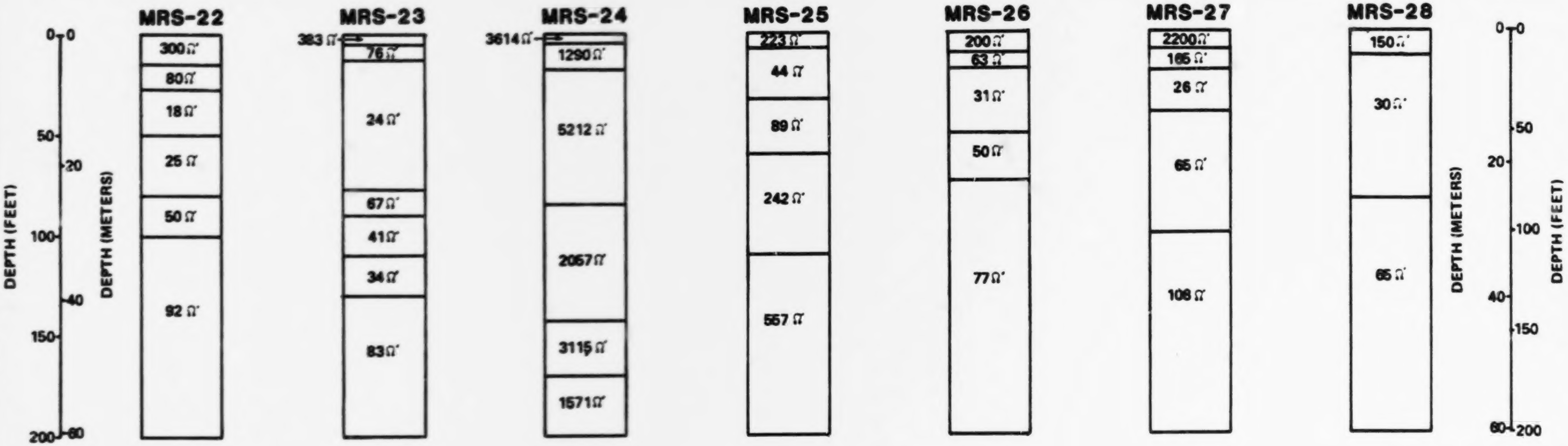

LEGEND

45Ω′ RESISTIVITY IN OHM - FEET

NOTE

SEE FIGURE E-1.2 FOR LOCATION OF SOUNDINGS

PREPARED J.D.G. DATE 12/22/80
REVISED ______ DATE ______
REVISED ______ DATE ______
APPROVED GHF DATE 12/22/80
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NATIONAL WASTE TERMINAL
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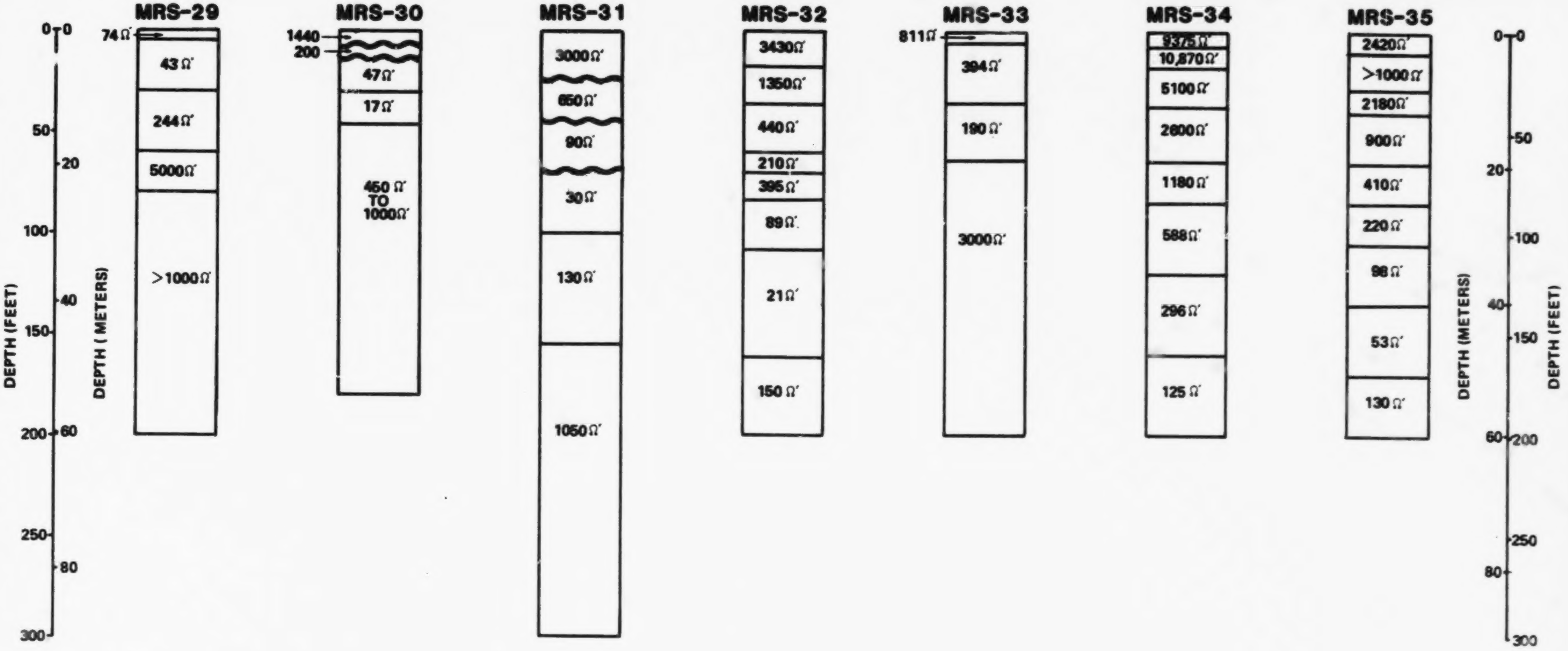
RICHTON DOME
PSEUDOLOGS OF ELECTRICAL
RESISTIVITY VERTICAL SOUNDINGS
TABLE E-1.2
PAGE 4 OF 7
JOB NO. MV9700


MRS-29
MRS-30
MRS-31
MRS-32
MRS-33
MRS-34
MRS-35
DEPTH (FEET)
DEPTH (METERS)
0
50
100
150
200
250
300
0
20
40
60
80
74Ω′
43Ω′
244Ω′
5000Ω′
>1000Ω′
1440
200
47Ω′
17Ω′
450 Ω′ TO 1000Ω′
3000Ω′
650Ω′
90Ω′
30Ω′
130Ω′
1050Ω′
3430Ω′
1350Ω′
440Ω′
210Ω′
395Ω′
89Ω′
21Ω′
150 Ω′
811Ω′
394Ω′
190 Ω′
3000Ω′
9375Ω′
10,870Ω′
5100Ω′
2800Ω′
1180Ω′
588Ω′
296Ω′
125 Ω′
2420Ω′
>1000Ω′
2180Ω′
900Ω′
410Ω′
220Ω′
98Ω′
53Ω′
130Ω′
DEPTH (METERS)
DEPTH (FEET)

LEGEND

45 Ω′ RESISTIVITY IN OHM - FEET

〰 GRADUAL CHANGE IN RESISTIVITY

NOTE

SEE FIGURE E-1.2 FOR LOCATION OF SOUNDINGS

PREPARED J.D.G. DATE 12/22/80
REVISED ________ DATE ________
REVISED ________ DATE ________
APPROVED GHF DATE 12/22/80
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NATIONAL WASTE TERMINAL
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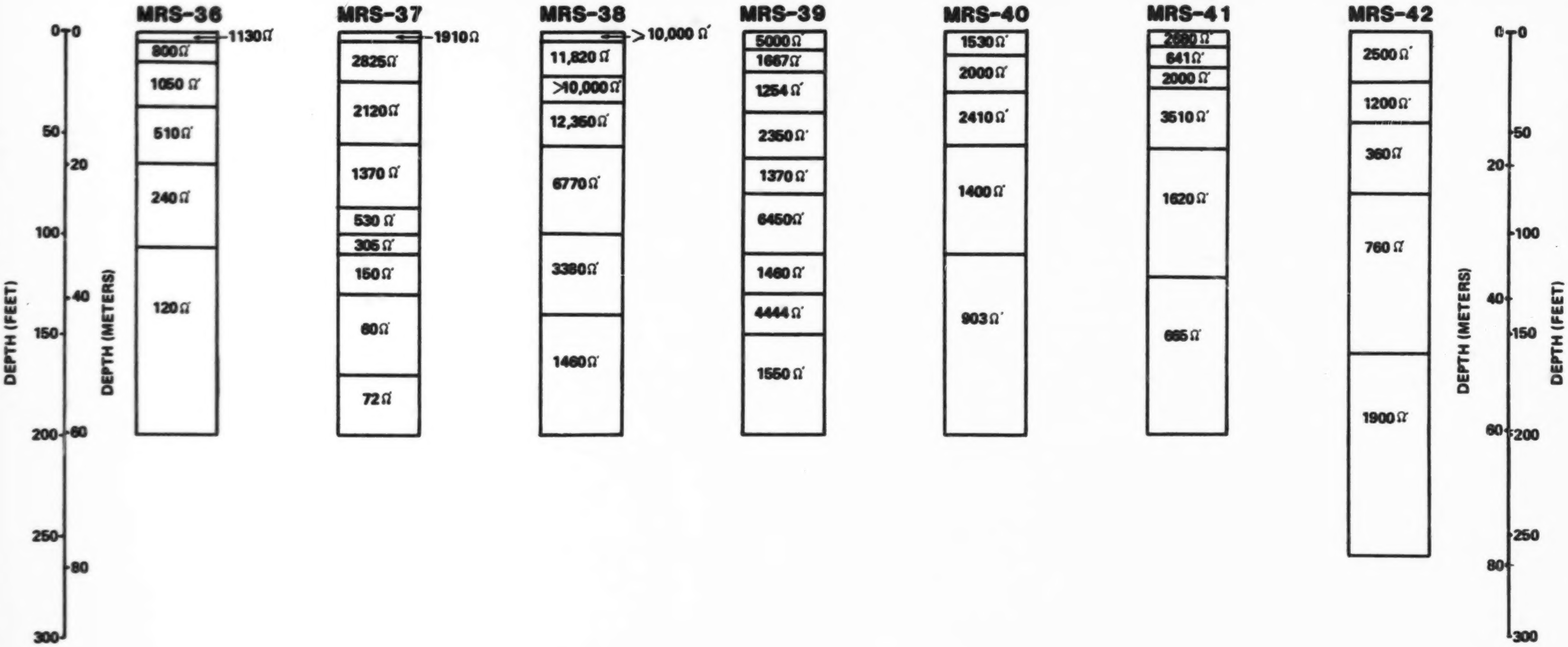
RICHTON DOME
PSEUDOLOGS OF ELECTRICAL
RESISTIVITY VERTICAL SOUNDINGS
TABLE E-1 2
JOB NO. M V9700
PAGE 5 OF 7



LEGEND

45Ω RESISTIVITY IN OHM - FEET

NOTE

SEE FIGURE E-1.2 FOR LOCATION OF SOUNDINGS

PREPARED J.D.G.	DATE 12/22/80
REVISED	DATE
REVISED	DATE
APPROVED GHF	DATE 12/22/80

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NATIONAL WASTE TERMINAL
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MISSISSIPPI STUDY AREA
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RICHTON DOME
PSEUDOLOGS OF ELECTRICAL RESISTIVITY VERTICAL SOUNDINGS

JOB NO. MV9700

TABLE E-1.2
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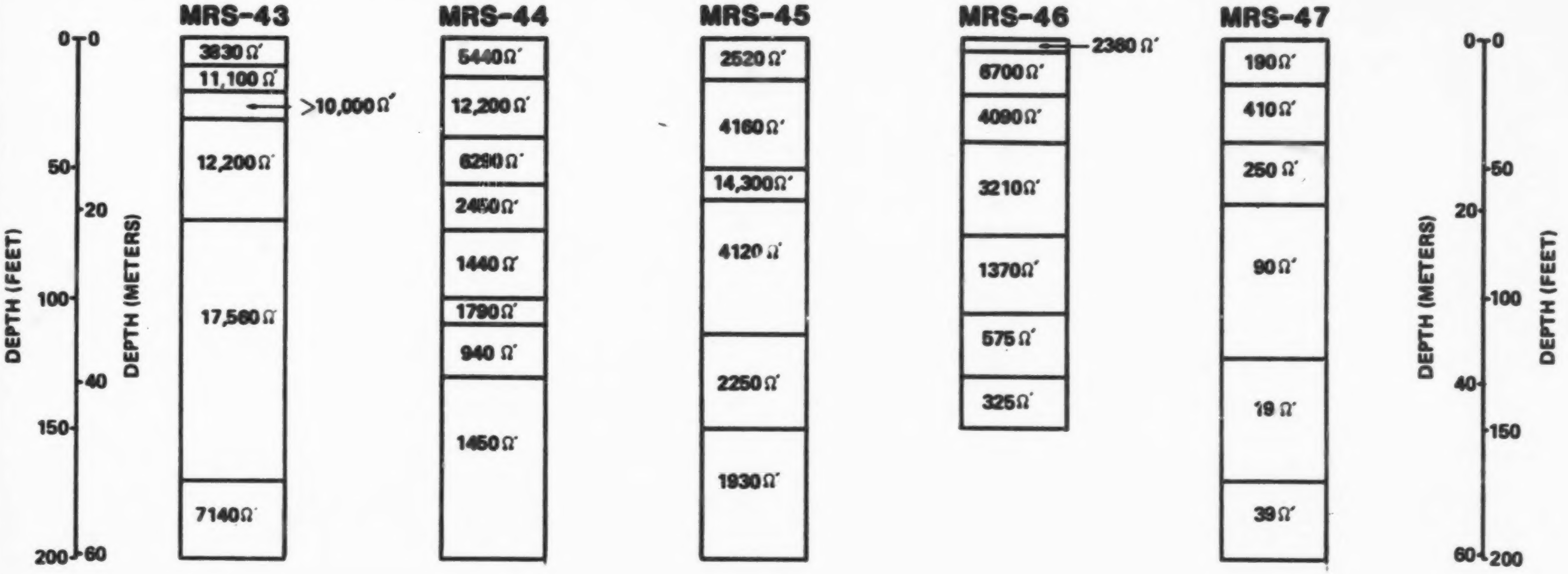
MRS-43
3830Ω'
11,100Ω'
>10,000Ω'
12,200Ω'
17,560Ω'
7140Ω'
MRS-44
5440Ω'
12,200Ω'
6290Ω'
2450Ω'
1440Ω'
1790Ω'
940Ω'
1450Ω'
MRS-45
2520Ω'
4160Ω'
14,300Ω'
4120Ω'
2250Ω'
1930Ω'
MRS-46
2360Ω'
6700Ω'
4090Ω'
3210Ω'
1370Ω'
575Ω'
325Ω'
MRS-47
190Ω'
410Ω'
250Ω'
90Ω'
19Ω'
39Ω'
DEPTH (FEET)
DEPTH (METERS)
0
50
100
150
200
20
40
60

LEGEND

45Ω' RESISTIVITY IN OHM - FEET

NOTE

SEE FIGURE E-1.2 FOR LOCATION OF SOUNDINGS

PREPARED	J.D.G.	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GHF	DATE	12/23/80

T-1589G-0

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MARIETTA, GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX E-1
RICHTON DOME
PSEUDOLOGS OF ELECTRICAL
RESISTIVITY VERTICAL SOUNDINGS
TABLE E-1.2
PAGE 7 OF 7
JOB NO. MV9700

MISSISSIPPI STUDY AREA

APPENDIX E-2

RESISTIVITY HORIZONTAL PROFILES

Ground-level electrical resistivity horizontal profiles were made by Law Engineering personnel in the areas adjacent to Cypress Creek and Richton Salt Domes in Mississippi to aid in the interpretation of the near-surface geology. The profiles were made concurrently with the resistivity vertical soundings (Appendix E-1). The work was performed with an A.B.E.M. Terrameter 4-cycle direct-current resistivity meter with the electrodes in a Wenner array. All work was done in accordance with Law Engineering Procedure No. 3.2, "Ground Level Resistivity Surveys Data Collection". Most profiles were conducted with a 30-meter (100-ft) "a" spacing between electrodes.

The measured resistivity value is an average of the resistivity of the materials through which the current flows, and is known as the "apparent resistivity". When only one material is present, the apparent resistivity is the true resistivity. Low apparent resistivities indicate the presence of clays, while a high apparent resistivity indicates the presence of sands and/or gravels. The resistivity value of each material is greatly dependent upon the porosity, the degree of saturation and the chemical character of the pore fluid.

Seventy-nine kilometers (49 mi) of electrical resistivity profiles were made in the vicinity of Cypress Creek Salt Dome between April 1979 and January 1980. The locations of the profiles and smoothed apparent resistivity values are shown in Figure E-2.1.

Eighty-two kilometers (51 mi) of electrical resistivity profiles were made in the area near Richton Salt Dome between September 1979 and April 1980. The locations of the profiles and smoothed apparent resistivity values are shown in Figure E-2.2.

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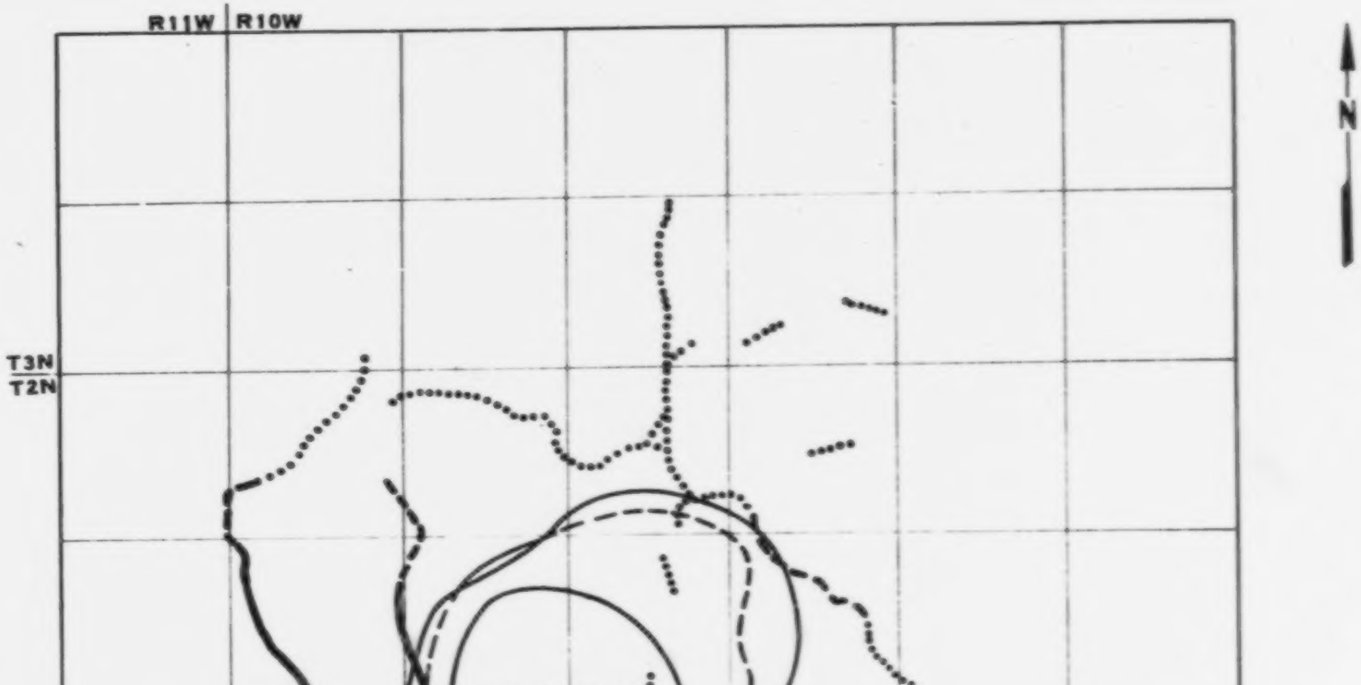
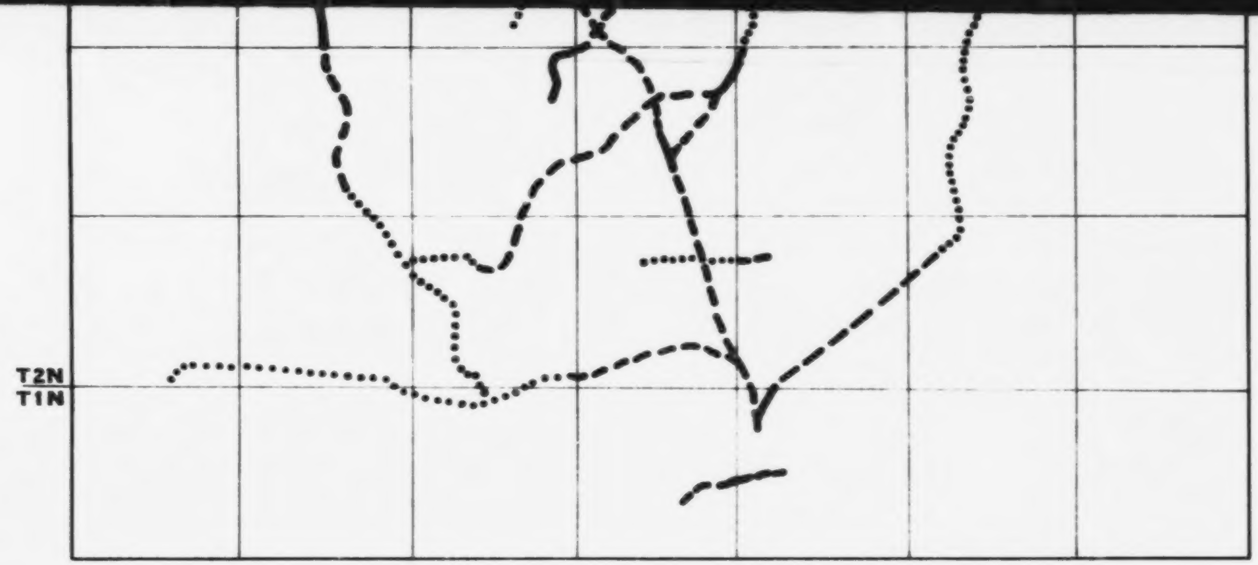
464


R11W
R10W
T3N
T2N
N
1000
2000

BEST DOCUMENT AVAILABLE



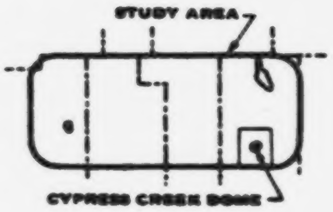
LEGEND

•••••••••• "LOW" APPARENT RESISTIVITY

▬ ▬ ▬ ▬ ▬ "MEDIUM" APPARENT RESISTIVITY

━━━━━━ "HIGH" APPARENT RESISTIVITY

—-1000— INTERPRETED SALT CONTOUR-ELEVATION FEET MSL (DASHED WHERE BELOW OVERHANG)



464A

NOTE:

THE RESISTIVITY VALUES HAVE BEEN SMOOTHED TO ELIMINATE SMALL AREAS OF BORDERLINE VALUES. THE VALUES ARE BASED UPON A WENNER ARRAY, GENERALLY WITH A 100-FOOT "A" SPACING.

1
0
1
MILES
1
0
1
KILOMETERS

PREPARED J.D.G. DATE 12/22/80
REVISED DATE
REVISED DATE
APPROVED GHF DATE 12/22/80
T-1560-0

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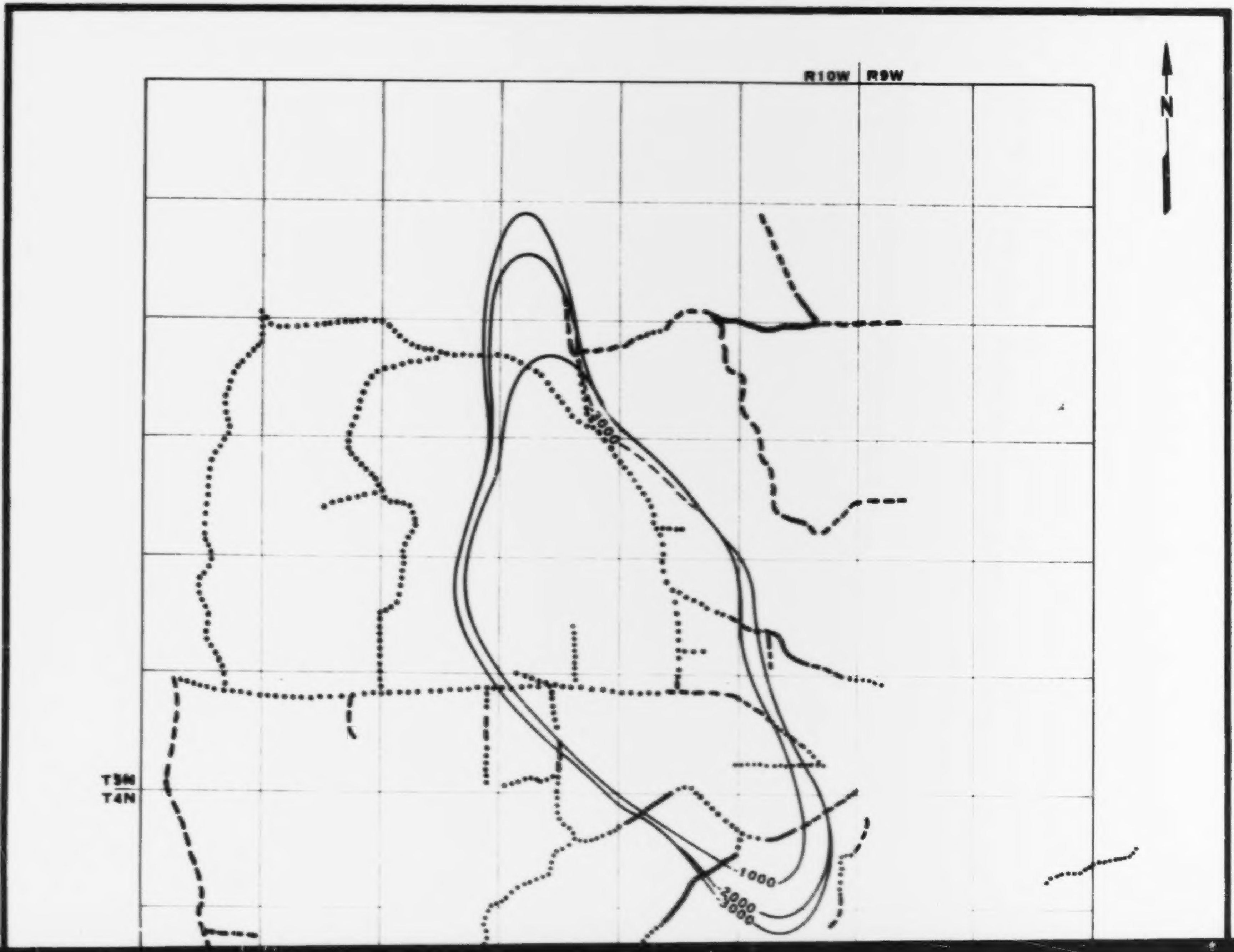
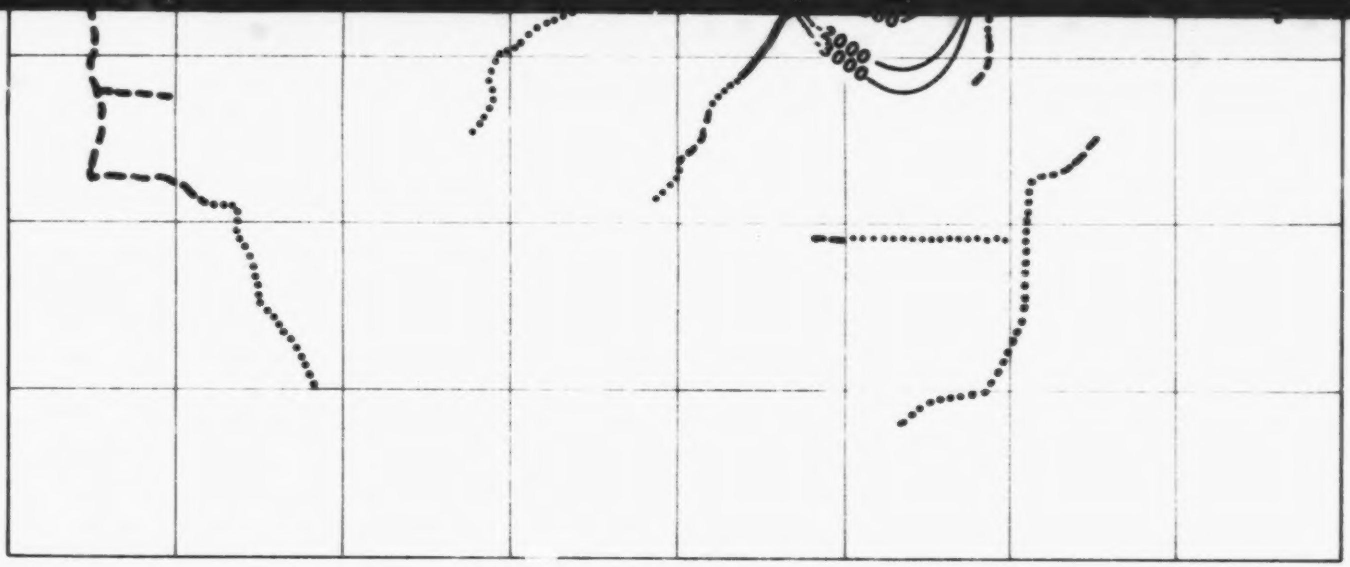
MISSISSIPPI STUDY AREA
APPENDIX E-2
CYPRESS CREEK DOME
LOCATION AND APPARENT RESISTIVITY
MAP OF HORIZONTAL PROFILES
JOB NO. MV9700
FIGURE E-2.1

FIGURE E-2.1


R10W
R9W
N
T5N
T4N
1000
-1000
-2000
-3000



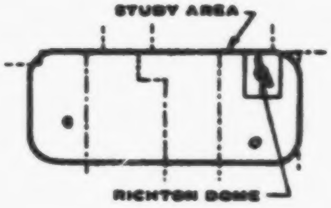
LEGEND

•••••• "LOW" APPARENT RESISTIVITY

— — — — "MEDIUM" APPARENT RESISTIVITY

━━━━ "HIGH" APPARENT RESISTIVITY

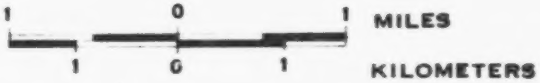
—-1000— INTERPRETED SALT CONTOUR-ELEVATION FEET MSL (DASHED WHERE BELOW OVERHANG)



465A

NOTE

THE RESISTIVITY VALUES HAVE BEEN SMOOTHED TO ELIMINATE SMALL AREAS OF BORDERLINE VALUES. THE VALUES ARE BASED UPON WENNER ARRAY, GENERALLY WITH A 100-FOOT "A" SPACING.



PREPARED	J.D.G.	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GHF	DATE	12/22/80

T-1561-0

NATIONAL WASTE TERMINAL
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LAW ENGINEERING TESTING COMPANY
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MISSISSIPPI STUDY AREA
APPENDIX E-2
RICHTON DOME
LOCATION AND APPARENT RESISTIVITY
MAP OF HORIZONTAL PROFILES

JOB NO. MV9700 FIGURE E-2.2

FIGURE E-2.2

MISSISSIPPI STUDY AREA

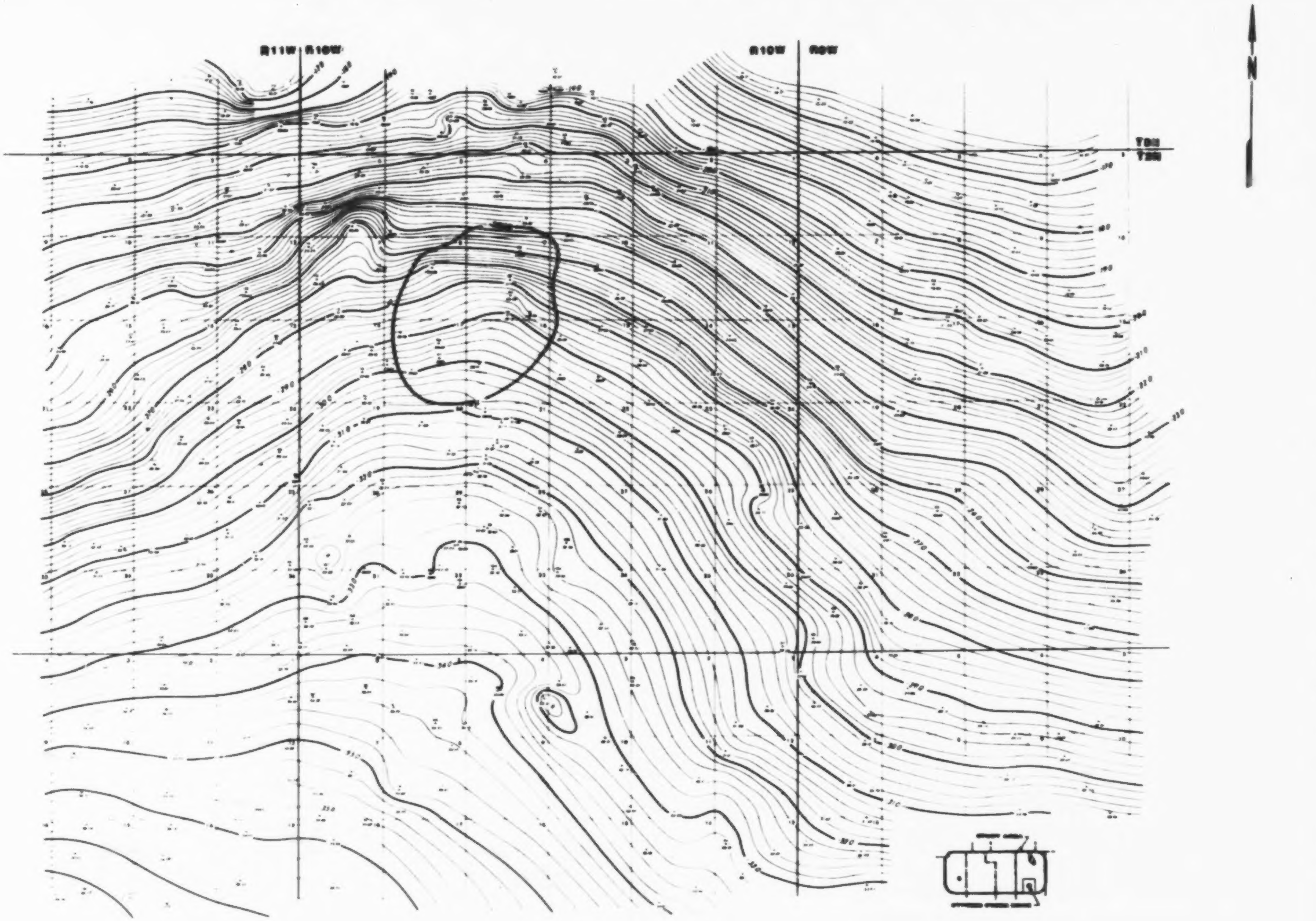
APPENDIX E-3

NEAR-DOME GRAVITY

Gravity data over Cypress Creek, Lampton, and Richton Salt Domes were acquired for the purpose of modeling dome shapes. Bouguer gravity values from previously measured stations were purchased and augmented by data from additional measurements performed for the Area Characterization study. The table below gives the number of gravity stations for each of the domes:

Salt Dome	Purchased Observations	Area Characterization Observations	Total Observations
Cypress Creek	250	104	354
Lampton	128	82	210
Richton	280	408	688

Bouguer gravity maps were prepared from the data (Figures E-3.1 through E-3.3). These are contour maps of gravity units (milligals) which reflect both local and regional trends in the gravity data. The regional trends, which are expressions of deep-seated structural features, were removed from the Bouguer map to produce a residual map. The dome shapes were modeled from the residual maps and other geological and geophysical data, including boring logs and seismic reflection surveys. All map preparation and modeling was done under subcontract to Law Engineering. (See also Law Engineering report "Gravity Studies at Seven Interior Salt Domes".)



LEGEND

AREA CHARACTERIZATION GRAVITY OBSERVATION STATION WITH STATION NUMBER AND BOUGUER GRAVITY VALUE IN MILLIGALS

PURCHASED GRAVITY OBSERVATION STATION WITH BOUGUER GRAVITY VALUE IN MILLIGALS

35.0 CONTOUR LINE OF EQUAL BOUGUER GRAVITY VALUE. VALUE IN MILLIGALS

3000 INTERPRETED SALT CONTOUR ELEVATION FEET MSL

1 0 1 MILES

1 0 1 KILOMETERS

NOTE

CONTOUR INTERVAL 0.2 MILLIGALS

PREPARED	DATE
REVISED	DATE
REVISED	DATE
APPROVED	DATE

NATIONAL WASTE TERMINAL
STORAGE PROGRAM
GEOLOGIC EVALUATION GULF
COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA, GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX E-2
CYPRESS CREEK DOME
BOUGUER GRAVITY MAP
FIGURE E 2 1

[redacted]

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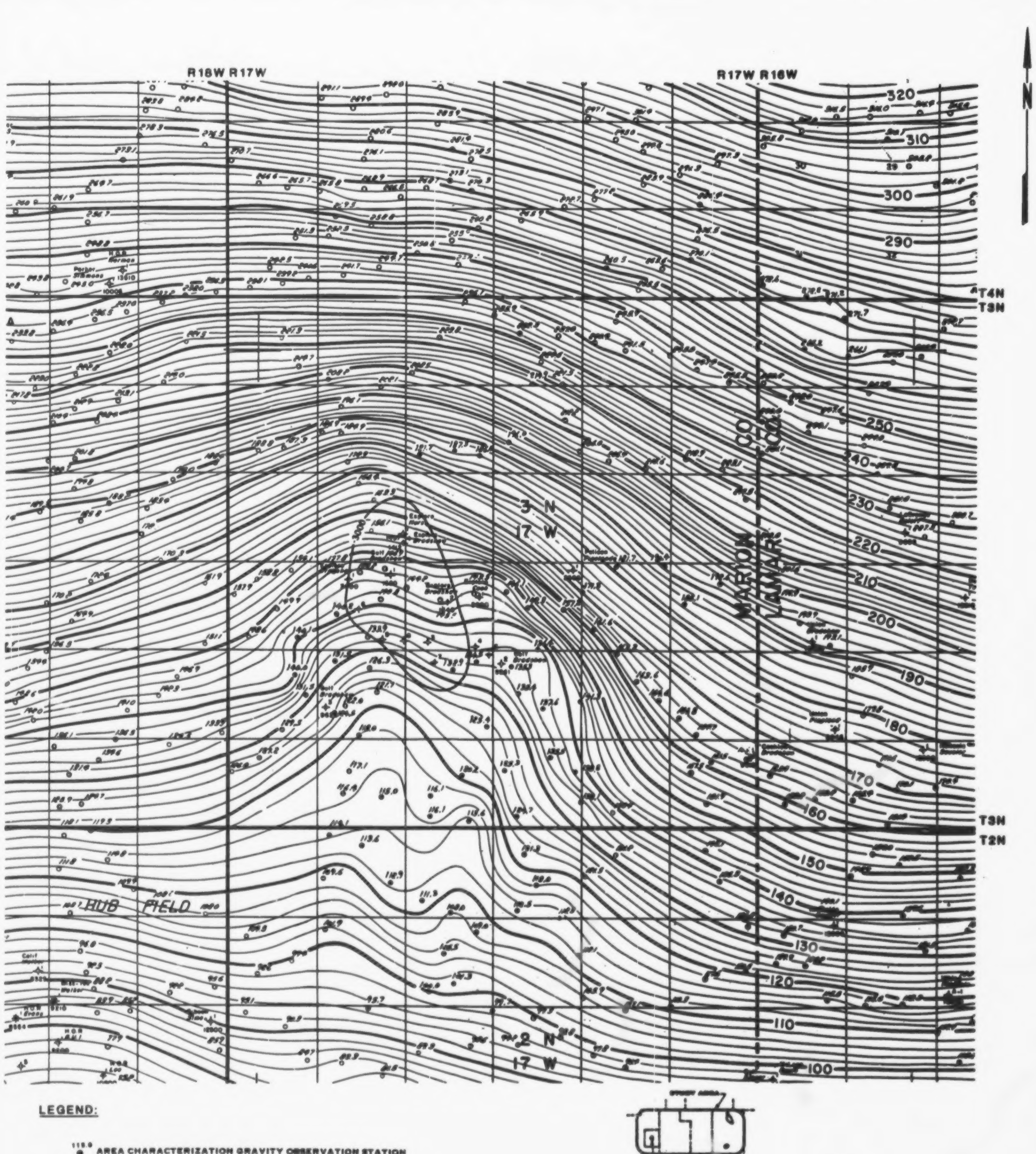
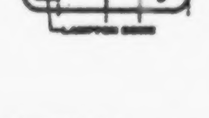

N
R18W R17W
R17W R16W
T4N
T3N
T3N
T2N
320
310
300
290
250
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
MARION
LAMAR
CO.
CO.
3 N
17 W
2 N
17 W
3000
HUB FIELD


STUDY AREA
LAMPTON DOME

LEGEND:

115.9 ● AREA CHARACTERIZATION GRAVITY OBSERVATION STATION WITH BOUGUER GRAVITY VALUE IN GRAVITY UNITS.

148.6 ○ PURCHASED GRAVITY OBSERVATION STATION WITH BOUGUER GRAVITY VALUE IN GRAVITY UNITS.

—160— CONTOUR LINE OF EQUAL BOUGUER GRAVITY VALUE. VALUE IN GRAVITY UNITS.

—3000— INTERPRETED SALT CONTOUR-ELEVATION FEET MSL

NOTE:

CONTOUR INTERVAL: 2 GRAVITY UNITS
(1 GRAVITY UNIT EQUALS 0.1 MILLIGAL)

1 0 1 MILES
1 0 1 KILOMETERS

PREPARED J.D.G.	DATE
REVISED	DATE
REVISED	DATE
APPROVED GHF	DATE

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NATIONAL WASTE TERMINAL
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MARIETTA, GEORGIA

MISSISSIPPI STUDY AREA
APPENDIX E - 3
LAMPTON DOME
BOUGUER GRAVITY MAP

JOB NO. MV9790 FIGURE E-3.3

E-3-3

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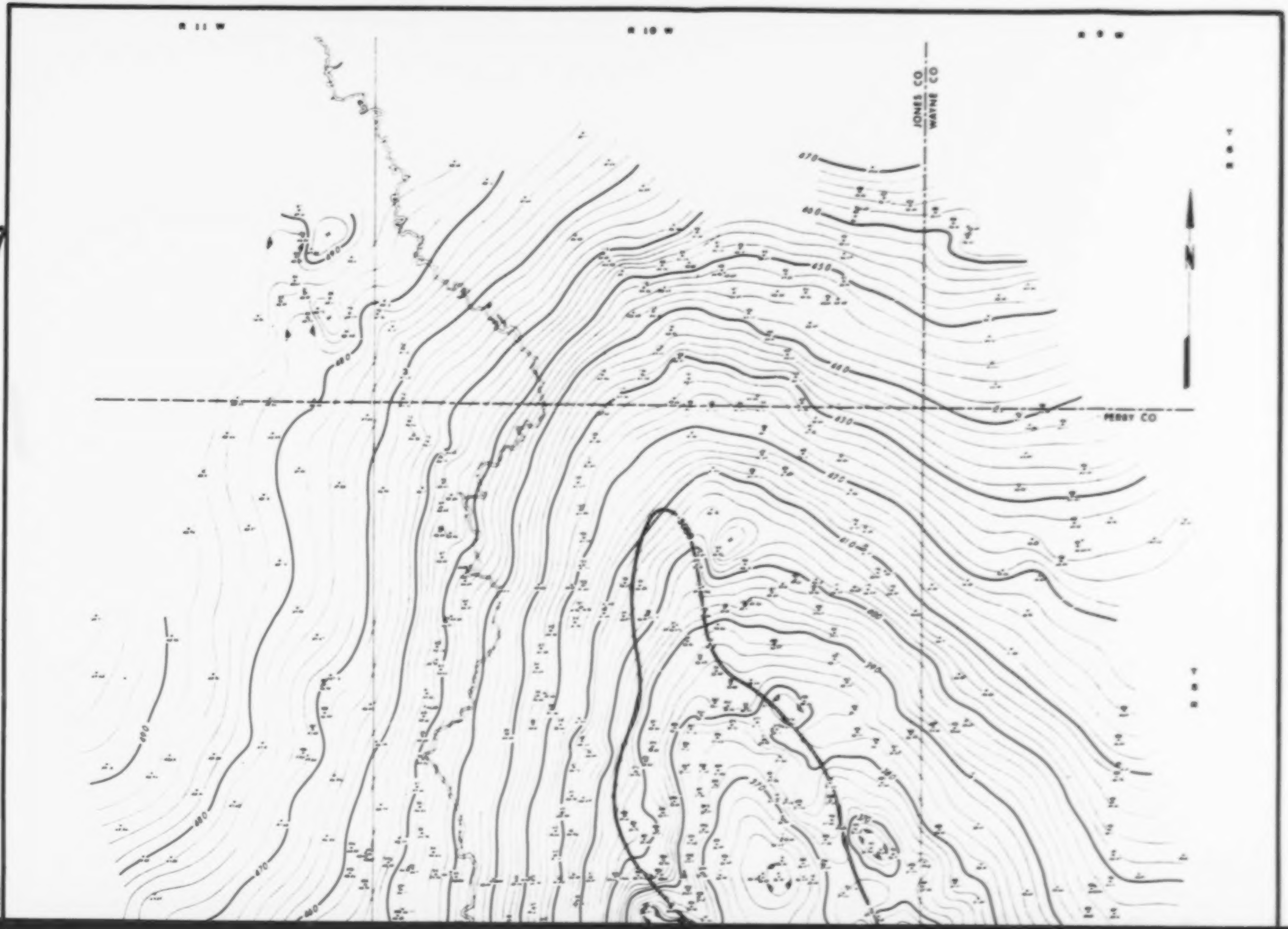
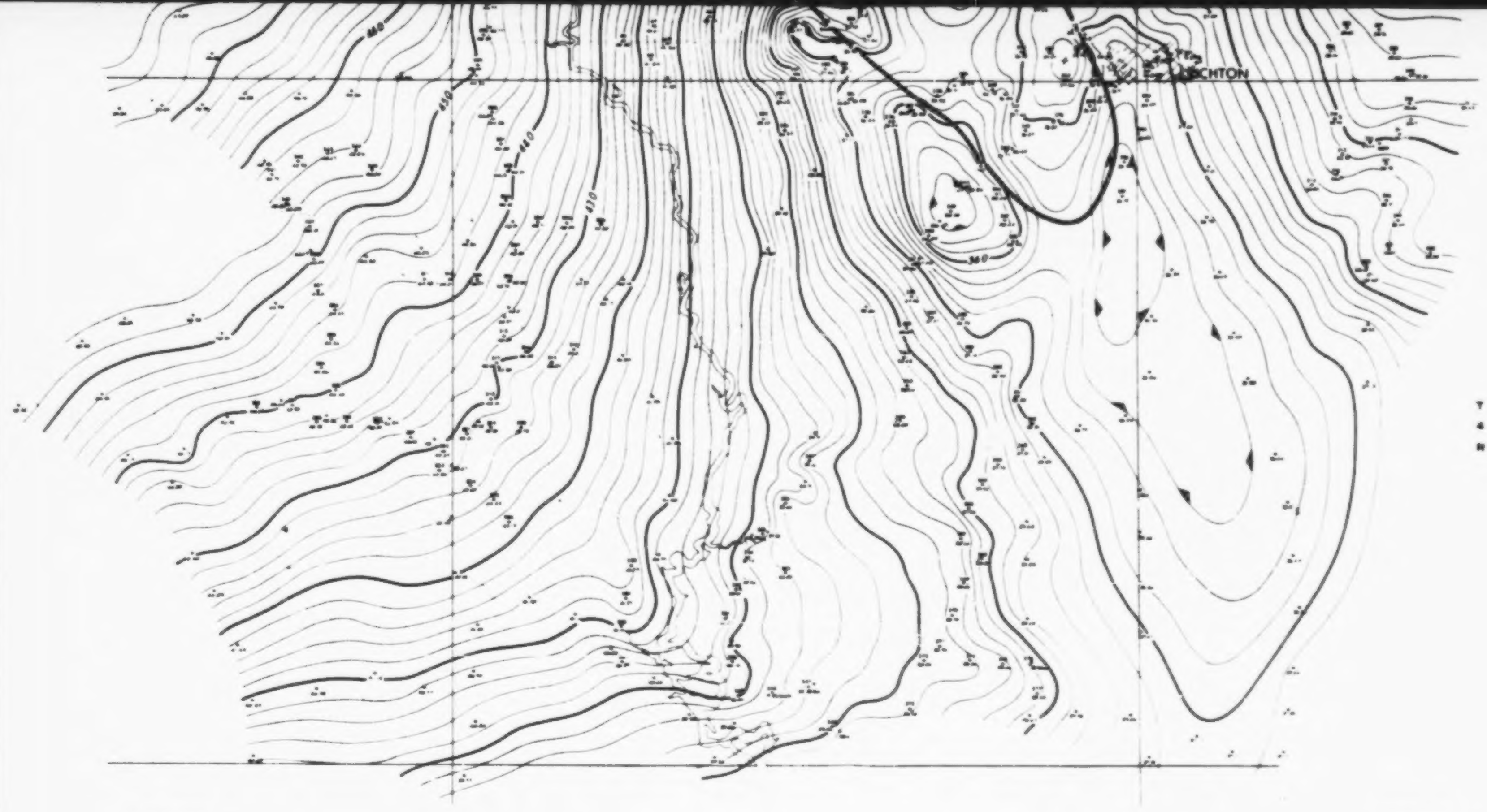

R 11 W
R 10 W
R 9 W
JONES CO
WAYNE CO
PERRY CO
N



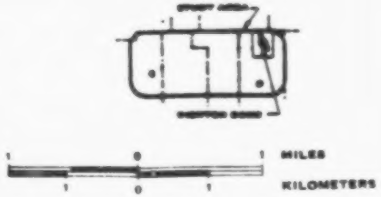
LEGEND

AREA CHARACTERIZATION GRAVITY OBSERVATION STATION WITH STATION NUMBER AND BOUGUER GRAVITY VALUE IN MILLIGALS

○ PURCHASED GRAVITY OBSERVATION STATION WITH BOUGUER GRAVITY VALUE IN MILLIGALS

— 38.0 — CONTOUR LINE OF EQUAL BOUGUER GRAVITY VALUE, VALUE IN MILLIGALS

— 3000 — INTERPRETED SALT CONTOUR-ELEVATION FEET MSL



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NOTE

CONTOUR INTERVAL 0.2 MILLIGALS

PREPARED LAB DATE
REVISED DATE
REVISED DATE
APPROVED GHF DATE

T-1892-0

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

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MISSISSIPPI STUDY AREA
APPENDIX E-3
RICHTON DOME
BOUGUER GRAVITY MAP

JOB NO MV8700 FIGURE E-3.3

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MISSISSIPPI STUDY AREA

APPENDIX E-4

HIGH-RESOLUTION SEISMIC SURVEYS

High-resolution seismic reflection surveys were performed at Cypress Creek and Richton Salt Domes in order to help define the attitude of the sedimentary units near the two domes, as well as to help define the sediment-salt stock contact and the shapes of the domes. The surveys recorded acoustic signals returning from reflecting strata at depths from about 244 to 1,067 meters (800 to 3,500 ft). The field work and data processing were performed by a subcontractor to Law Engineering. The processed time sections produced were interpreted by Law Engineering personnel and the results presented in the form of seismic sections correlated to the geologic units.

Three seismic surveys, totaling approximately 13 km (8.2 mi) in length, were completed at Cypress Creek Dome during March and April 1980. The locations of these lines are shown in Figure 13-8 (Volume VII) and the interpreted seismic sections are shown in Figures 13-9 through 13-11. Three additional surveys, totaling about 10 km (6 mi), were completed at Richton Dome during April 1980. The locations of these lines are shown in Figure 13-46 and the interpreted sections are represented in Figures 13-47 through 13-49 of Volume VII.

The nature of the raw field data, which was recorded on magnetic tape, makes it impractical to reproduce here. The scale of the processed data, presented in the form of time sections, is not conducive to legible, interpretable reproduction on a small scale and is therefore not included here. (See Law Engineering report "High Resolution Seismic Surveys at Three Interior Salt Domes.")

APPENDIX F

Microseismicity

MISSISSIPPI STUDY AREA

APPENDIX F-1

MICROSEISMIC DATA

No microseismic surveys were conducted in Mississippi during the Area Characterization phase of the Gulf Coast Salt Dome Project.

APPENDIX G

Seismicity

MISSISSIPPI STUDY AREA

APPENDIX G-1

SEISMICITY

A search of the Law Engineering earthquake files was performed to produce a table of earthquakes with Modified Mercalli Intensities (MMI) of IV-V or greater within the region between 86° to 100° W longitude and 29° to 38° N latitude (Table G-1.1). The locations of the epicenters of these events are shown in Figure G-1.1 and tabulated in Table G-1-1.

The Law Engineering earthquake file is a compilation of earthquakes from the following sources:

1. Department of Commerce, 1973, Earthquake History of the United States (Rev. through 1970), Washington, D.C.: Department of Commerce. 5 volumes.
2. Moneymaker, Berlen C., 1954-1958, Earthquakes in Tennessee and Nearby Sections of Neighboring States. Journal of the Tennessee Academy of Science, v. 29-33 (exclusive).
3. Coast and Geodetic Survey, 1928-   , United States Earthquakes. Washington, D.C.: Government Printing Office. (Annual Publication)
4. Magnetic Tape Chronological Sort 1900-1973, Earthquake Data File, National Geophysical and Solar-Terrestrial Data Center, Boulder, Colorado, Environmental Data and Information Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce

5. U.S. Geological Survey, Preliminary Determination of Epicenters. (Monthly)

6. Law Engineering Testing Company, Internal Reports, Marietta, Ga.

7. Heigold, P. C., 1972, Notes on the Earthquake of September 15, 1972 in Northern Illinois. Urbana, IL: Illinois Geological Survey, Environmental Geology Notes 59.

8. U.S. Geological Survey, Earthquakes of the United States. (Quarterly)

9. Nuttli, Otto, 1974, Magnitude-Recurrence Relation for Central Mississippi Valley Earthquakes. Bulletin of the Seismological Society of America, v. 64, no. 4, p. 1189-1207.

10. Bradley, E. A., and Bennett, T. J., 1965, Earthquake History of Ohio, BSSA, Vol. 55, No. 4, pp. 745-752

11. Bollinger, Gilbert A., 1975, A Catalog of Southeastern United States Earthquakes, 1754-1974. Blacksburg, VA: Virginia Polytechnic Institute

12. McClain, William C. and Myers, O. H., 1970, Seismic History and Seismicity of the Southeastern Region of the United States. Oak Ridge, TN: Oak Ridge National Laboratory

13. U.S. Geological Survey, Earthquake Information Bulletin. (Bi-monthly)

14. Docekal, Jerry, 1970, Earthquakes of the Stable Interior with Emphasis on the Midcontinent. Lincoln, NE: University of Nebraska, Dissertation, 2 volumes

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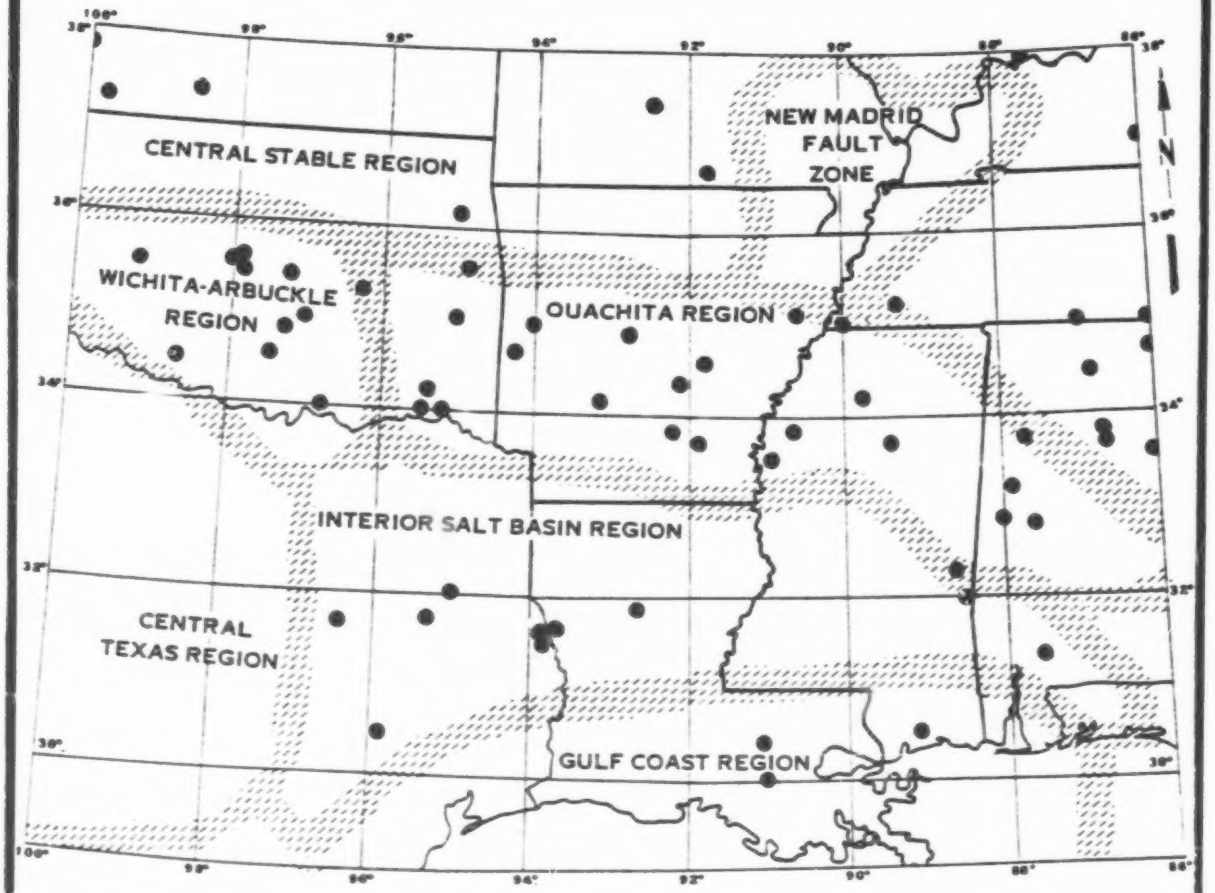

CENTRAL STABLE REGION
NEW MADRID FAULT ZONE
WICHITA-ARBUCKLE REGION
OUACHITA REGION
INTERIOR SALT BASIN REGION
CENTRAL TEXAS REGION
GULF COAST REGION
N
100°
98°
96°
94°
92°
90°
88°
86°
38°
36°
34°
32°
30°

NOTES

THE EPICENTERS PLOTTED CORRESPOND TO EVENTS WITH MODIFIED MERCALLI INTENSITY OF IV - V OR GREATER

EPICENTERS WITHIN NEW MADRID FAULT ZONE HAVE NOT BEEN PLOTTED DUE TO HIGH DENSITY SPACING AND SCALE LIMITATION

SEE TABLE G-1.1 FOR LIST OF EVENTS

LEGEND

▨	SEISMO-TECTONIC REGION BOUNDARY
●	EARTHQUAKE EPICENTER (ONE OR MORE EVENTS)

100 0 100 MILES
160 0 160 KM

PREPARED LDG DATE 12/22/80 REVISED ______ DATE ______ REVISED ______ DATE ______ APPROVED GHE DATE 12/22/80 T-1594-1	NATIONAL WASTE TERMINAL STORAGE PROGRAM GEOLOGIC EVALUATION GULF COAST SALT DOMES LAW ENGINEERING TESTING COMPANY MARIETTA GEORGIA	MISSISSIPPI STUDY AREA APPENDIX G-1 EPICENTRAL LOCATION MAP JOB NO. MV9700 FIGURE G-1.1

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APPENDIX G-1

TABLE G-1.1 (PAGE 1 OF 9)

REGIONAL HISTORIC SEISMICITY
(Lat. 29°-38°N, Long. 86°-100°W)

YEAR	DATE	LOCAL TIME	MMI	LOCATION	LAT.	LONG.	FELT AREA (SQ.MI.)	REF.	REMARKS
1811	DEC. 16	02:00	XII	NEW MADRID, MO.	36.6	89.6	2000000	1	FELT TO THE EAST
1812	JAN. 23	09:00	XII	NEW MADRID, MO.	36.6	89.6		1	
1812	FEB. 7	03:45	XII	NEW MADRID, MO.	36.6	89.6		1	
1818	MARCH 1	00:00	IV-V	MISSISSIPPI VALLEY	35.0	90.0		2	*COORDS, DATE, TIME
1820	NOV. 9	16:00	IV-V	CAPE GIRARDEAU, MO.	37.3	89.5		1	
1834	NOV. 20	13:40	V	NORTHERN KENTUCKY	37.0	86.0		1	*COORDS
1841	DEC. 27	23:50	V	NEAR HICKMAN, KY.	36.4	89.2		1	*COORDS
1843	JAN. 4	20:45	VIII	EASTERN ARKANSAS	35.5	90.5	400000	9	INT. IX-X - REF.2
1855	MAY 2	21:33	IV-V	CAIRO, IL.	37.0	89.2		2	*COORDS
1856	NOV. 9	00:00	IV-V	IL., KY., TN.	37.0	89.0		2	*COORDS, TIME
1865	AUG. 17	09:00	VII	DYERSBURG, TN.	36.0	89.5	24000	9	
1878	MARCH 12	04:00	V	COLUMBUS, KY.	36.8	89.2		1.	FELT LOCALLY
1878	NOV. 18	23:52	VI	SOUTHEASTERN MISSOURI	36.7	90.4	150000	1	INT. VI-VIII, REF. 2
1882	JULY 20	04:00	V	SOUTHERN ILLINOIS	38.0	90.0	3000	1	
1882	OCT. 22	16:15	VI-VII	ARKANSAS	35.0	94.0	135000	1	
1883	JAN. 11	01:12	VI	CAIRO, IL.	37.0	89.2	80000	1	
1883	APRIL 12	02:30	VI-VII	CAIRO, IL.	37.0	89.2		1	FELT LOCALLY
1883	JULY 14	01:30	IV-V	CAIRO, IL.	37.0	89.2		2	
1883	DEC. 5	09:20	V	IZARD CO., AR.	36.3	91.8		1	FELT LOCALLY
1886	FEB. 4	20:00	V	ALABAMA	32.8	88.0	1600	1	
1886	FEB. 11	00:00		ALABAMA	32.8	88.0		1	*TIME, INT.
1887	AUG. 2	12:36	V	CAIRO, IL.	37.0	89.2		1	WIDESPREAD EFFECTS
1889	JULY 19	19:12	VI	MEMPHIS, TN.	35.2	90.0		1	INT. V-VII, REF. 2
1891	JAN. 8	00:00	VII	RUSK, TX.	31.7	95.2		1	

*ESTIMATE

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APPENDIX G-1

TABLE G-1.1 (PAGE 2 OF 9)

REGIONAL HISTORIC SEISMICITY
(Lat. 29°-38°N, Long. 86°-100°W)

YEAR	DATE	LOCAL TIME	MMI	LOCATION	LAT.	LONG.	FELT AREA (SQ.MI.)	REF.	REMARKS
1891	JULY 26	20:28	VI	EVANSVILLE, IN.	37.9	87.5		1	
1891	SEPT. 26	22:55	V	CAIRO, IL.	37.0	89.2		2	*COORDS
1895	OCT. 31	05:08	IX	MISSOURI	37.0	89.4	1000000	9	INT. VIII, REF. 1
1895	OCT. 31	05:08	IX	MISSOURI	37.0	89.4	1000000	9	INT. VIII, REF. 1
1897	APRIL 30	22:00	IV-V	TENNESSEE AND ILLINOIS	36.0	89.0		1	*COORDS
1903	NOV. 27	03:20	V	NEW MADRID, MO.	36.5	89.5	70000	1	
1904	OCT. 27	00:00	V	KANSAS	37.7	100.0	2700	1	*TIME
1905	AUG. 21	23:08	VI	MISSISSIPPI VALLEY	36.0	90.0	40000	1	*COORDS
1907	JULY 4	03:00	IV-V	FARMINGTON, MO.	37.7	90.4	400	1	
1908	SEPT. 28	13:34	IV-V	NEW MADRID, MO.	36.5	89.5	5000	1	
1908	OCT. 27	18:27	V	CAIRO, IL.	37.0	89.2	5000	1	
1909	OCT. 23	01:10	V	SOUTHEASTERN MISSOURI	37.0	89.5	40000	1	INT. V-VI, REF. 2
1911	MARCH 31	10:57	V	RISON, AR.	33.8	92.2	18000	1	2 SHOCKS, 73 MIN. APART
1914	DEC. 29	19:00	IV-V	ANDERSON, TX.	30.5	95.9	70	3	
1915	APRIL 28	17:40	IV-V	NEW MADRID, MO.	36.4	89.5	200	1	
1915	OCT. 26	01:40	V	MAYFIELD, KY.	36.7	88.6		1	FELT LOCALLY
1915	DEC. 7	12:40	V-VI	NEAR MOUTH OF OHIO RIVER	36.7	89.1	60000	1	
1916	OCT. 18	16:04	VII	IRONDALE, AL.	33.5	86.2	100000	1	
1916	DEC. 18	23:42	I-VII	HICKMAN, KY.	36.6	89.3		1	FELT LOCALLY
1917	JUNE 29	20:23	V	ALABAMA	32.7	87.5		1	FELT LOCALLY
1918	SEPT. 10	10:30	V	EL RENO, OK.	35.5	98.0		1	FELT LOCALLY, AFTERSHOCKS
1918	OCT. 15	21:30	V	WESTERN TENNESSEE	35.2	89.2	20000	1	
1919	NOV. 1	14:40	IV-V	ARKANSAS	36.2	90.9		1	FELT LOCALLY
1922	MARCH 22	16:30	V	SOUTHERN ILLINOIS	37.1	88.6	25000	1	*COORDS, 2 SHOCKS

*ESTIMATE

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APPENDIX G-1

TABLE G-1.1 (PAGE 3 OF 9)

REGIONAL HISTORIC SEISMICITY
(Lat. 29°-38°N, Long. 86°-100°W)

YEAR	DATE	LOCAL TIME	MMI	LOCATION	LAT.	LONG.	FELT AREA (SQ.MI.)	REF.	REMARKS
1922	MARCH 23	15:45	V	WESTERN KENTUCKY	37.0	88.0		1	*COORDS
1922	MARCH 29	20:20	V	CENTRAL TENNESSEE	35.0	86.0		2	*COORDS
1922	MARCH 30	10:53	V	MISSISSIPPI VALLEY	35.2	90.6		2	
1922	NOV. 26	21:31	V	MISSISSIPPI VALLEY	37.0	90.5		2	*COORDS
1923	OCT. 28	11:10	VII	MARKED TREE, AR.	35.5	90.3	40000	1	
1923	NOV. 26	17:25	VI	MISSISSIPPI VALLEY	35.4	90.4		9	*COORDS
1923	DEC. 31	21:05	V	ARKANSAS	35.4	90.3	30000	1	
1924	MARCH 2	05:16	V	KENTUCKY	36.9	89.1	15000	1	
1925	APRIL 26	22:05	V	INDIANA	38.0	87.5	100000	1	
1925	MAY 13	06:00	V	KENTUCKY	36.7	88.6	3000	1	
1925	SEPT. 2	05:55	V-VI	HENDERSON, KY.	37.8	87.6	75000	1	
1926	JUNE 20	08:20	V	OK.-AK. BORDER	35.5	94.9	18000	14	
1927	MAY 7	02:28	VII	MISSISSIPPI VALLEY	36.5	89.0	130000	1	
1927	JUNE 16	07:00	V	SCOTTSBORO, AL.	34.7	86.0	2500	1	
1927	AUG. 13	10:00	V	MISSISSIPPI VALLEY	36.4	89.5		2	*COORDS
1929	NOV. 27		V	SOUTHERN KANSAS	37.2	99.7		4	
1929	DEC. 27	18:30	VI	EL RENO, OK.	35.5	98.0	8000	1	
1930	AUG. 29	00:27	V	KY., TN., IL., MO.	37.0	89.0		2	*COORDS
1930	OCT. 19	06:17	V-VI	DONALDSONVILLE, LA.	30.0	91.0	18000	6	
1931	MAY 5	07:18	V	CULLMAN, AL.	33.7	86.6	6500	3	INT. V-VI, REF. 1
1931	DEC. 16	21:36	VI	BATESVILLE, MS.	34.1	89.8	65000	3	INT. VI-VII, REF. 1
1932	APRIL 9	04:15	V	MEXIA, TX.	31.7	96.4	1000	3	
1933	AUG. 19	13:30	V	EL RENO, OK.	35.5	98.0	200	3	INT. VI, REF. 1
1933	DEC. 9	02:40	V	MANILA, AR.	35.8	90.2	100	3	INT. VI, REF. 1
1934	APRIL 11	11:40	V	TX.-OK. BORDER	33.9	95.5	3000	3	
1934	AUG. 19	18:47	VI	RODNEY, MO.	37.0	89.2	28000	3	INT. VII, REF. 1

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TABLE G-1.1 (PAGE 4 OF 9)

REGIONAL HISTORIC SEISMICITY
(Lat. 29°-38°N, Long. 86°-100°W)

YEAR	DATE	LOCAL TIME	MMI	LOCATION	LAT.	LONG.	FELT AREA (SQ.MI.)	REF.	REMARKS
1936	MARCH 14	11:20	V	SOUTHEASTERN OKLAHOMA	34.0	95.2	900	3	
1937	MAY 16	18:50	IV-V	NORTHEASTERN ARKANSAS	36.1	90.6	25000	1	INT. III, REF. 3
1938	SEPT. 17	21:34	IV-V	NORTHEASTERN ARKANSAS	35.5	90.3	90000	1	INT. IV, REF. 3
1939	JUNE 19	15:43	V	ARKADELPHIA, AR.	34.1	93.1		3	FELT LOCALLY
1940	MAY 31	13:02	IV-V	OHIO RIVER	37.0	88.0	1000	2	*COORDS
1941	OCT. 18	01:48	V	BESSIE, OK.	35.4	99.0	100	12	
1941	NOV. 16	21:09	V-VI	COVINGTON, TN.	35.5	89.7		3	FELT LOCALLY, INT. V, REF.2
1947	SEPT. 20	15:30	IV-V	WINNFIELD, LA.	31.9	92.7		12	
1947	DEC. 15	21:27	V	NEAR OSCEOLA, AR.	35.5	90.0	10000	2	*COORDS
1949	JAN. 13	21:45	V	MISSISSIPPI VALLEY	36.4	89.5	7000	2	*COORDS
1950	FEB. 8	04:37	V	LEBANON, MO.	37.4	92.4		3	
1952	FEB. 20	16:35	V	TN.-MO. BORDER	36.4	89.5		3	
1952	APRIL 9	10:29	VII	EL RENO, OK.	35.4	97.8	140000	3	
1952	APRIL 16	00:05	V	EL RENO, OK.	35.4	97.8		3	
1952	JULY 16	17:48	VI	DYERSBURG, TN.	36.2	89.6		3	
1953	MARCH 17	07:12	VI	CONCHO, OK.	35.6	97.8		3	2 SHOCKS
1954	FEB. 2	10:53	VI	POPLAR BLUFF, MO.	36.7	90.3		3	
1954	APRIL 26	20:09	V	MEMPHIS, TN.	35.2	90.0		3	
1955	JAN. 25	01:24	VI	TN., AR., MO.	35.6	90.3	30000	3	
1955	FEB. 1	08:45	V	GULFPORT, MS.	30.4	89.1		3	
1955	MARCH 29	03:03	VI	FINLEY, TN.	36.0	89.5		3	
1955	SEPT. 5	19:45	V	FINLEY, TN.	36.0	89.5		3	
1955	DEC. 11	01:43	V	DYER CO., TN.	36.0	89.5		3	*TIME
1956	JAN. 6	05:58	VI	SOUTHERN KANSAS	37.3	98.5	16000	3	

*ESTIMATE

TABLE G-1.1 (PAGE 5 OF 9)

REGIONAL HISTORIC SEISMICITY
(Lat. 29°-38°N, Long. 86°-100°W)

YEAR	DATE	LOCAL TIME	MMI	LOCATION	LAT.	LONG.	FELT AREA (SQ.MI.)	REF.	REMARKS
1956	JAN. 28	22:14	VI	TN.-AR. BORDER	35.6	89.6	11500	3	
1956	FEB. 16	17:30	VI	EDMOND, OK.	35.4	97.3		3	
1956	APRIL 2	10:03	V	SOUTHEASTERN OKLAHOMA	34.2	95.4		3	
1956	OCT. 29	03:24	V	CARUTHERSVILLE, MO.	36.1	89.6		3	
1956	OCT. 30	04:36	VII	NORTHEASTERN OKLAHOMA	36.2	95.0	3700	3	
1956	NOV. 25	22:13	VI	WAYNE CO., MO.	37.1	90.6	21500	3	
1957	MARCH 19	10:38	V	NORTHEASTERN TEXAS	32.0	95.0	10100	3	*COORDS, 4 SHOCKS
1957	MARCH 26	02:27	V	PADUCAH, KY.	37.0	88.4		3	FELT LOCALLY
1957	APRIL 23	04:24	VI	BIRMINGHAM, AL.	34.5	86.8	11500	3	
1958	JAN. 26	10:56	V	MEMPHIS, TN.	35.2	90.0		3	FELT LOCALLY
1958	JAN. 27	23:57	V	IL.-KY.-MO. BORDER	37.0	89.0	300	3	
1958	APRIL 8	16:26	V	OBION CO., TN.	36.2	89.1	400	3	
1958	APRIL 26	01:30	V	LAKE CO., TN.	36.3	89.5		3	
1958	NOV. 19	12:15	V	BATON ROUGE, LA.	30.3	91.1		3	FELT LOCALLY
1959	FEB. 13	02:37	V	BOGOTA, TN.	36.2	89.5	170	3	
1959	JUNE 15	06:45	V	SEMINOLE CO., OK.	35.0	97.0		3	*COORDS
1959	JUNE 17	04:27	VI	SOUTHWESTERN OKLAHOMA	34.5	98.5	12000	3	
1959	AUG. 12	13:06	VI	AL.-TN. BORDER	35.0	87.0	2800	3	
1959	DEC. 21	10:25	V	FINLEY, TN.	36.0	89.5	400	3	
1960	JAN. 28	15:38	V	DYER CO., TN.	36.0	89.5		3	FELT LOCALLY
1960	APRIL 21	04:45	V	LAKE CO., TN.	36.3	89.5		3	FELT LOCALLY
1961	JAN. 10	19:40	V	SOUTHEASTERN OKLAHOMA	35.0	95.0		3	*COORDS
1961	APRIL 27	01:30	V	SOUTHEASTERN OKLAHOMA	35.0	95.0		3	*COORDS, TIME
1962	FEB. 2	00:44	VI	NEW MADRID, MO.	36.5	89.6	35000	3	

*ESTIMATE

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TABLE G-1.1 (PAGE 6 OF 9)

REGIONAL HISTORIC SEISMICITY
(Lat. 29°-38°N, Long. 86°-100°W)

YEAR	DATE	LOCAL TIME	MMI	LOCATION	LAT.	LONG.	FELT AREA (SQ.MI.)	REF.	REMARKS
1962	JUNE 26	19:29	V	SOUTHERN ILLINOIS	37.7	88.5		3	
1962	JULY 23	00:05	VI	SOUTHERN MISSOURI	36.1	89.8		3	
1963	MARCH 3	11:30	VI	SOUTHEASTERN MISSOURI	36.7	90.1	100000	3	
1963	JULY 8	17:52	V	SOUTHEASTERN MISSOURI	37.0	90.5		4	*INT.
1963	AUG. 2	18:38	V	IL.-KY. BORDER	37.0	88.8		3	
1964	JAN. 16	23:10	VI	SOUTHEASTERN MISSOURI	36.8	89.5		4	*INT.
1964	APRIL 23	19:21	V	WESTERN LOUISIANA	31.5	93.8		3	
1964	APRIL 24	01:34	V	WESTERN LOUISIANA	31.6	93.8		3	
1964	APRIL 27	18:31	V	WESTERN LOUISIANA	31.5	93.8		3	
1964	APRIL 28	15:19	V	WESTERN LOUISIANA	31.7	93.6		3	
1964	MAY 23	05:26	V	SOUTHEASTERN MISSOURI	36.5	90.0		4	*INT.
1964	MAY 23	09:01	VI	SOUTHEASTERN MISSOURI	36.5	89.9		4	*INT.
1964	AUG. 16	05:36	V	HEMPHILL, TX.	31.4	93.8		3	
1965	FEB. 10	21:40	VI	SOUTHEASTERN MISSOURI	36.4	89.7		4	*INT.
1965	AUG. 13	23:46	VI	SOUTHWESTERN ILLINOIS	36.3	89.5		3	*INT.
1965	AUG. 14	07:14	VII	SOUTHWESTERN ILLINOIS	37.1	89.2		3	
1965	AUG. 15	00:07	V	SOUTHWESTERN ILLINOIS	37.4	89.5		3	2 SHOCKS
1965	OCT. 20	20:05	VI	EASTERN MISSOURI	37.8	91.0	160000	3	
1965	NOV. 4	01:44	V	SOUTHEASTERN MISSOURI	37.1	91.0		4	*INT.
1965	DEC. 19	16:19	VII	NORTHEASTERN ARKANSAS	35.9	89.9		4	*INT.
1966	FEB. 13	17:20	V	SOUTHEASTERN MISSOURI	37.1	91.0		4	*INT.
1966	FEB. 26	02:10	*V	SOUTHEASTERN MISSOURI	37.2	91.0		4	*INT.
1967	JUNE 4	10:14	VI	GREENVILLE, MS.	33.6	90.9	25000	3	
1967	JUNE 29	07:57	V	GREENVILLE, MS.	33.6	90.9		3	

*ESTIMATE

BEST DOCUMENT AVAILABLE

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TABLE G-1.1 (PAGE 7 OF 9)

REGIONAL HISTORIC SEISMICITY
(Lat. 29°-38°N, Long. 86°-100°W)

YEAR	DATE	LOCAL TIME	MMI	LOCATION	LAT.	LONG.	FELT AREA (SQ.MI.)	REF.	REMARKS
1967	JULY 21	03:15	VI	SOUTHEASTERN MISSOURI	37.5	90.4		3	
1968	FEB. 9	19:35	V	SOUTHEASTERN MISSOURI	36.5	89.9		3	*INT.
1968	OCT. 14	08:43	VI	DURANT, OK.	34.0	96.8		3	
1968	NOV. 9	11:02	VII	SOUTHERN ILLINOIS	38.0	88.5	580000	3	
1969	JAN. 1	17:36	VI	CENTRAL ARKANSAS	34.8	92.6	23000	3	
1969	MAY 2	05:33	V	EASTERN OKLAHOMA	35.2	96.3	13000	3	
1970	MARCH 26	21:44	V	SOUTHEASTERN MISSOURI	36.5	89.7		3	*INT.
1970	NOV. 16	20:14	VI	ARKANSAS	35.9	89.9	78000	3	
1971	MARCH 14	11:28	V	CARROLLTON, AL.	33.1	87.9		3	*INT.
1971	OCT. 1	12:50	V	NORTHEASTERN ARKANSAS	35.8	90.4	55000	3	
1972	JAN. 31	23:42	V	NORTHEASTERN ARKANSAS	36.4	90.8		3	
1972	MARCH 29	14:39	V	NEW MADRID, MO.	36.2	89.6	63800	3	
1973	JAN. 7	16:56	V	KENTUCKY	37.4	87.3		3	*INT.
1973	JAN. 8	03:12	V	MISSISSIPPI	33.8	90.6		5	*INT.
1973	JAN. 12	05:57	V	EASTERN MISSOURI	37.9	90.5		5	*INT.
1973	MAY 25	08:40	V	MISSISSIPPI	33.8	90.6		3	*INT.
1973	DEC. 20	04:45	V	NEW MADRID, MO.	36.2	89.6		5	*INT.
1974	JAN. 7	19:13	V	NEW MADRID, MO.	36.2	89.4		5	*INT.
1974	FEB. 15	16:36	V	ARKANSAS	34.1	93.1		5	SEVERAL WEAKER SHOCKS
1974	FEB. 24	01:54	V	ARKANSAS	35.8	90.4		5	*INT.
1974	MARCH 4	08:24	V	ARKANSAS	35.7	90.4		5	*INT.
1974	MARCH 9	22:34	IV-V	NEW MADRID, MO.	36.2	89.5		5	*INT.
1974	MARCH 12	06:30	V	TENNESSEE	35.7	89.8		5	*INT.
1974	MAY 13	00:52	VI	NEW MADRID, MO.	36.7	89.4	800	8	

*ESTIMATE

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TABLE G-1.1 (PAGE 8 OF 9)

REGIONAL HISTORIC SEISMICITY
(Lat. 29°-38°N, Long. 86°-100°W)

YEAR	DATE	LOCAL TIME	MMI	LOCATION	LAT.	LONG.	FELT AREA (SQ.MI.)	REF.	REMARKS
1974	AUG. 11	08:30	V	FREMONT, MO.	36.9	91.2		5	
1974	DEC. 10	00:02	V	SOUTHWESTERN ALABAMA	31.3	87.5		8	
1974	DEC. 12	23:04	V	NORTHEASTERN ARKANSAS	34.7	91.9		8	
1975	FEB. 13	13:44	V	NEW MADRID, MO.	36.5	89.6		3	
1975	JUNE 13	16:40	VI	NEW MADRID, MO.	36.5	89.7		5	
1975	JUNE 24	05:12	IV-V	ALABAMA	33.7	87.8		3	
1975	JULY 6	02:48	IV-V	NEW MADRID, MO.	36.2	89.5		5	*INT.
1975	AUG. 20	03:14	IV-V	NEW MADRID, MO.	36.6	89.8		5	*INT.
1975	AUG. 24	18:44	IV-V	EASTERN MISSOURI	37.2	90.9		5	*INT.
1975	AUG. 24	21:01	IV-V	EASTERN MISSOURI	37.2	90.9		5	*INT.
1975	AUG. 25	01:11	V	NEW MADRID, MO.	36.1	89.8		5	*INT.
1975	AUG. 28	22:23	VI	NORTHERN ALABAMA	33.8	86.6	10000	3	
1975	OCT. 11	21:58	V	OKLAHOMA	34.8	97.4		5	*INT.
1975	NOV. 29	08:30	VI	FOSTER, OK.	34.5	97.4		3	
1975	DEC. 2	21:01	VI	NEW MADRID, MO.	36.5	89.6		3	
1976	MARCH 24	18:41	VI	ARKANSAS	35.6	90.5		3	
1976	APRIL 15	01:04	V	KENTUCKY	37.4	87.3		5	
1976	MAY 22	01:41	V	NEW MADRID, MO.	36.0	89.8		3	
1976	SEPT. 25	08:07	V	ARKANSAS	35.6	90.4		3	
1976	OCT. 22	18:41	V	MISSISSIPPI	32.2	88.7		5	*INT.
1976	DEC. 13	02:36	V	EASTERN MISSOURI	37.8	90.2		3	
1977	JAN. 1	16:57	VI	CAPE GIRARDEAU, MO.	37.6	89.8		8	
1977	MAY 3	20:00	V	MISSISSIPPI	32.0	88.4		8	
1977	JUNE 2	17:29	VI	ARKANSAS	34.6	94.2		8	*INT.

*ESTIMATE

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TABLE G-1.1 (PAGE 9 OF 9)

REGIONAL HISTORIC SEISMICITY
(Lat. 29°-38°N, Long. 86°-100°W)

YEAR	DATE	LOCAL TIME	MMI	LOCATION	LAT.	LONG.	FELT AREA (SQ.MI.)	REF.	REMARKS
1977	NOV. 4	05:21	V-VI	ROCKY MOUNT, MS.	33.8	89.3		5	
1978	AUG. 30	18:31	V	DYERSBURG, TN.	36.1	89.4		5	
1978	SEPT. 23	01:33	V	ARKANSAS	33.7	91.9		5	
1978	DEC. 10	20:07	V	MISSISSIPPI	32.0	88.5		8	
1979	FEB. 27	02:25	V	JEFFERSON CO., AR.	34.4	92.1		13	
1979	FEB. 27	16:55	V	STRAWBERRY, AR.	35.9	91.3		13	
1979	MARCH 13	22:37	V	OKLAHOMA	35.5	97.8		8	
1979	JUNE 10	23:12	V	TN.-MO. BORDER	36.2	89.6		13	
1979	JUNE 25	12:11	V	POINSETT CO., AR.	35.6	90.4		13	
1979	NOV. 5	10:35	V	MO.-AR. BORDER	36.5	91.0		13	

*ESTIMATE

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